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Frontispiece

Sollya heterophylla.

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BLIGHT ON FLOWERS;

OR,

FIGURES AND DESCRIPTIONS OF

THE

INSECTS

INFESTING

THE FLOWER GARDEN;

INCLUDING VARIOUS MEANS FOR DESTROYING THOSE WHICH BY THEIR DEPREDATIONS OCCASION MANY OF THE

DISEASES OF PLANTS.

ALSO,

COPIOUS DIRECTIONS FOR THE SUCCESSFUL MANAGEMENT OF ALL KINDS OF FLOWERS, WHETHER IN THE

HOTHOUSE, GREENHOUSE, OR OPEN AIR.

Illustrated with Seventeen Plates.

BY SAMUEL HEREMAN.

GARDENER TO VISCOUNT PALMERSTON.

LONDON:

T. M. CRADOCK, PATERNOSTER ROW.

1842.

WELLCOME
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TO MRS. HALL,

WHOSE

GENERAL BENEVOLENCE,

EXCELLENT TASTE IN GARDENING,

AND KIND PATRONAGE OF WHATEVER IS LIKELY TO PROMOTE THE INTERESTS OF HORTICULTURE IN IRELAND,

ARE EQUALLED BY FEW,

THIS FEEBLE ATTEMPT,

TO POINT OUT SOME OF THE MANY

CAUSES OF FAILURE

IN THE

CULTURE OF FLOWERING PLANTS,

WITH THEIR REMEDIES,

IS, WITH GRATITUDE AND RESPECT,

HUMBLY DEDICATED,

BY HER MOST OBEDIENT SERVANTS,

THE AUTHORS.

PREFACE.

LITTLE more than a year has elapsed since the "GARDENER'S LIBRARY" commenced, and if we may judge from the flattering reception this Volume on the many Failures incident to the best managed Flower Gardens has already met with, it might be said that we have, at least in some degree, met the general wants of the present age.

It cannot be doubted but, to many of our scientific readers, various errors in the histories of the different insects will be observed; should such be the case, we trust they will consider these decrepancies as consequent on our imperfect observations as plain practical Gardeners; and any corrections will be received with thankfulness.

The volume contains upwards of 60 coloured figures of Insects found in our Flower Gardens, some of which are extensively injurious. These figures have been drawn either from living specimens found on the plants at the time, or sent by friends, or from such as were previously collected, and are in the cabinet of the Authors.

The Names of the Insects are chiefly taken from Mr. Stephen's and Mr. Curtis' Nomenclature, and the Synonyms are such as are either generally used amongst gardeners, attached to the Insects in other cabinets, or have been observed in works on the subject which have come under the notice of the Authors.

The means of preventing injuries to Flowering Plants, occasioned by Insects and other causes, detailed in the following pages, are such as have been practised by the Authors themselves for several years with success.

The volume contains also nineteen coloured Figures of Plants, chiefly designed to elucidate the natural habits of the Insects.

There are also several designs for Horticultural Buildings, as Conservatories and Plant Stoves, with calculations on the probable expenses of erection.

The general letter-press not only points out the causes of Failure in the Culture of Flowering Plants, and means to be used as preventatives and cures, but also enters largely into the propagation and general culture of most genera, and the peculiarities of others.

Besides this, there are a few directions for forming Flower Gardens, Fountains, planting Shrubberies, and most other particulars necessary to be known by all lovers of gardening.

The increasing demand for the work, leads the Authors to conclude, that another edition will be called for very shortly; previous to the issue of which, they particularly request that any inaccuracies may be pointed out by their numerous readers, that they may have an opportunity of correcting them in the second edition; also any additional information will be thankfully received.

Narrow Water, *March*, 1840.

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INTRODUCTION.

History furnishes abundant proofs, that as mankind in any nation have advanced in civilization, so a taste for Gardening has arisen in proportion.

Gardening is of two kinds; 1st. the Culture of Plants of Utility, and, 2nd. those of Ornament.

Plants of Utility consist of the various tribes of Culinary Vegetables, and of those which produce Fruit for the dessert, or other purposes: the habitation of the first is called the Kitchen Garden; and that of the second, the Orchard and Fruit Garden.

The situation appropriated to the culture of Ornamental Plants consitutes the Pleasure and Flower Garden, and if tastefully disposed and decorated with a variety of flowers, it becomes an enchanting object, whether it be on a small scale—merely a plot before the door of a humble cottager, or around the splendid palace of the opulent.

Perhaps at no age of the world has the public mind been more alive to the culture and introduction of Flowering Plants than at the present. During the last few years many valuable periodicals have appeared, and some are still in progress, disseminating knowledge, and inciting to further exertion in so rational and pleasing a pursuit.

In treating on the general culture of Flowering Plants, it is necessary to separate them into three divisions.

1st. Such as have been introduced from tropical countries, and require a high temperature. These are called Stove or Hothouse Plants.

2nd. Those brought from more temperate climates, requiring little more than shelter from frost,—called Greenhouse Plants.

3rd. Such as will bear the open air, denominated Hardy Plants.

The whole art of Flower Gardening consists in supplying these different Plants with suitable food, and a proper temperature.

Notwithstanding the utmost care of the Gardener, he is subject to many failures, some arising from climate, and other circumstances over which he has no control; but others from causes which, if properly understood, might for the most part be prevented.

Science consists in tracing every thing to causes and effects,—and, to be correct, must be founded on observation and experience.

To illustrate further what we mean by the science of Gardening, we may mention a few occurences which are familiar to every person interested in Flowers.—A fine Carnation suddenly dies off, just as it was coming into flower.—A splendid Dahlia suddenly has all its petals damaged, just when it was ready for exhibition.—Ranunculus Roots come up yellow and sickly, and although fine roots were planted, few of them flower.—The Rose Bushes shew abundance of blossom buds, but just as they appear about to expand, a small hole is perceived on one side, and the buds wither without ever opening. These, and a thousand other instances might be mentioned. Now science searches out and exposes the true causes of these failures, and thus opens a way for the application of remedies which may be applied with certain results.

This volume of the Gardener's Library is intended not only to give directions for the successful management of the Flower Garden in all its departments, but also to shew the causes of failure, and the best means of prevention.

That this may be done more effectually, each Plate contains figures of the various Insects infesting the Plants, in both the Hothouse, Greenhouse, and Open Air.

In the Letter-press is given descriptions, histories, and the means for destroying these Insects, as practised by the Authors themselves, or under their immediate inspection.

The Authors pledge themselves, that, as practical men, nothing shall be recommended by them but what may be safely depended upon; and they trust that their little work will be found what its title indicates,—The Gardener's Library.

Narrow Water, *Jan.* 1839.

Thrips. Chermes Aphis Brown Scale

Liverpool

DISEASES AND INSECTS INFESTING THE CAMELLIA,

AND OTHER PLANTS OF SIMILAR HABITS.

The only insects infesting plants of this description are the Thrips, (*Thrips Physapus*), fig. 1; the Chermes, (*Pyslla Cratægi*), fig. 2; the Brown Scale, (*Coccus Hesperidum*), fig. 3; and the Aphis, (*Aphis Vitis*), fig. 4. Also, if the plants are kept in a hot and humid atmosphere during their season of torpidity, they are liable to the mildew. The Thrips and Chermes disfigure the plants by destroying the cuticle of the leaves; causing a spotting, not unlike that produced by the Red Spider, (*Acarus Telarius*); and the Coccus and Aphis check the growth, by pumping up the juices, and thus cause the extremities of the shoots to become stunted and diseased; and the mildew, by spreading over the leaves, stops up the pores, and prevents a free circulation of the juices.

THRIPS PHYSAPUS.

Common Thrips.—*Fig.* 1.

Order, *Homoptera.* Division, *Thripidæ.*

This is a well known and common insect, measuring about the twentieth part of an inch in length, and appearing on the leaves like small black lines, as shewn in figure 1. Both sexes have four straight, long, narrow wings, slightly crossed, as shewn in the magnified figure, but are rarely seen flying. When once these little pests have become established amongst a collection of plants, they are extremely troublesome to get rid of, particularly if there be a bark bed in the house, as when any means are adopted likely to eradicate them, they take shelter in the bark, and afterwards return to the plants as before.

To destroy them.—Fumigation with tobacco is the usual means

resorted to for their destruction; but I have found, after ten years experiments, that frequent applications of a mixture of tobacco water, lime water, and soot water, perfectly clear, is by far the most successful. This mixture may be sprinkled over the plants, either with a syringe, engine, or rose watering pot. When they attack plants with very delicate leaves, another mode of destroying them must be resorted to, which shall be treated of in its proper place.

PSYLLA CRATÆGI.

HAWTHORN CHERMES.—*Fig.* 2.

ORDER, *Homoptera.* DIVISION, *Psyllidæ.*

This is a small pale green insect, not much unlike the common Aphis, but far more active; and when touched, will leap a considerable distance. After repeated observations, I think the species found on shining leaved plants in hothouses identical with the Chermes on the Hawthorn, and have therefore adopted the name as above.

These insects generally occupy the underside of leaves, where the females deposit their eggs, inserting them beneath the cuticle by means of the tubes at the extremity of their bodies. They usually deposit about 20 eggs on each leaf, but occasionally twice that number. The young, when hatched, are small, slightly hairy, have six legs, and feed in societies, moving little during their larvæ state from the place where they first received life. When they become pupæ, little alteration can be perceived in their form, except that the rudiments of wings are visible on the males.

In the perfect state the males have four wings, but the females are wingless, both of which are shown in the magnified figures (2). The females at first are active; but previous to laying their eggs they become heavy, and move slowly.

When the leaves are tender, the deposition of the eggs beneath the cuticle causes irregular bulges; but in stiff-leaved plants, as the Camellia, &c. the punctures have no other effect than that of spotting, after the manner of the Thrips.

TO DESTROY THE CHERMES.—Use the lime, soot, and tobacco water, as recommended for the Thrips, but this insect is destroyed more readily than the former: also, fumigation with tobacco is quite successful.

COCCUS HESPERIDUM.

BROWN SCALE.—*Fig.* 4.

ORDER, *Homoptera.* DIVISION, *Coccidæ.*

The Brown Scale adheres both to the leaves and stems of all tender exotics with hard wood and shining leaves, appearing like small brown, oval, lifeless patches: these are the females. The males have two long, erect wings, elevated much in the same manner as those of the Aphis: they are few in number compared with the females. If the underside of the flat shield (fig. 4, *c*) be examined, a number of eggs (*d*) will be found. These eggs, after deposition by the parent, are shortly hatched, and the young insects spread themselves in all directions over the plant, being at first very small, of a yellowish colour, and nearly transparent, (*e*): each female amongst them having selected a spot suited to her wants, there fixes herself for life, and in her turn becomes a mother. After depositing her eggs she immediately dies, and her outer shield becoming dry, remains fixed, as a secure protection for her tender family until they are capable of entering, in their turn, on the same business of life. The males (*f*) are very short lived, and although they possess wings, seldom appear to fly, but may usually be seen crawling, at a very slow pace, over the leaves where the females have taken their residence.

Early in the spring is the chief time when the young are produced. As soon as the young leaves are formed, the insects fix themselves along the mid ribs, both on the upper and under sides, and also upon the tender shoots, and if not prevented will effectually check the growth of the plants.

TO DESTROY THE BROWN SCALE.—The usual method is to sponge the leaves with soft soap and water, and afterwards syringe them with pure water, to prevent the soap disfiguring the plants. This is an effectual way of destroying these insects; but it requires much time, often far more than the gardener can spare.—Another mode which I practice with equal success to the above, and in one-fourth of the time, is to water the plants infested over head with soap suds from the washhouse, and the next day sprinkle them with lime and soot water, perfectly clear: this ought always to be done early in the spring, when the young first appear on the leaves.

APHIS VITIS ?

Vine Louse.—*Fig.* 3.

Order, *Homoptera.* Division, *Aphidæ.*

We are not certain whether the Aphis infesting plants of this description be truly the Aphis Vitis or not, but the resemblance is so exact, that we have ventured to suppose it to be the same. They attack the young and tender wood, and being remarkably prolific, soon cause the extremities of the shoots to become stunted and curled. The females are wingless, (fig. 3), but the males have four long upright wings, and in sunny weather may be seen flying round the plants.

To destroy the Aphis.—Fumigation with tobacco will speedily eradicate them, as will also watering over head with diluted tobacco water.

The Mildew may be eradicated by syringing with sulphur and water, or mixing a little sulphur in the liquid recommended for destroying the insects, at the time of applying it.

CULTURE OF THE CAMELLIA.

Camellia japonica Donklaeri, (Plate 1), Donklaer's Japan Camellia.—The *flowers* of this variety expand about three inches, are very double, of a delicate white, beautifully marked with zigzag crimson lines, occasionally deeply blotched with the same colour: the *petals* are irregular.

Of this lovely variety we know nothing, except that it was raised on the Continent, and was named in compliment to M. Donklaer, Curator of the Louvain Botanic Garden.

Plants may be obtained in several of the London Nurseries, and from Mr. Cunningham, of Liverpool, where it flowered last November, (1838), and where our drawing was made.

Propagation of Camellias.—This is performed several ways; by layers, cuttings, seeds, inarching, grafting, and budding, but only the four first are to be depended upon.

By Layers.—A branch of one year old wood may be laid in a pot, or otherwise, as most convenient, any time from the middle of August until the beginning of March.

With a sharp knife make an incision half way through the wood, and half an inch long, on the upper side of the branch, just

below a good bud; slightly twist the branch, so as to lodge the tongue or cut part on the soil, peg it down, and cover it with mould. Layers will root without tongueing, but not so quickly.

By Cuttings.—Double varieties strike by cuttings, equally as well as single ones; but several of the choice kinds do not make such fine roots as the single ones. In August cut off the young ripe wood, four joints long, just below a bud; take off the two lower leaves from each cutting, and insert the cuttings in a pot of finely sifted leaf mould and heath mould, well mixed, (this is preferable to sand, the usual method,) fit a glass over them, and plunge them immediately in a tan bed; if this is not convenient, place them for a month in a shady part of the greenhouse, and afterwards plunge them in a hot-bed of dung, and in one month, or six weeks, they will have struck root.

Cuttings will also grow without either a bell glass or plunging in heat, but the success is precarious.

Striking in Water.—This mode is sometimes as successful as the former, and far more convenient for those who have no bark or hot-beds; it merely consists in putting the ends of the prepared cuttings in a bottle of water instead of planting in soil. The bottle may be hung up in the window of a dwelling house, where plenty of light and sun is admitted, and renewing the water every other day in fine weather: in six weeks, or two months, they will have made good roots. If the bottle was plunged in a hot-bed, the roots would be formed earlier.—February is the best time for this, just when the wood begins to grow.

Inarching, or Grafting by Approach.—Perform this any time from the beginning of February to the end of March. Fix the pot containing the stock securely, then cut with a sharp knife a thin piece from the side, about two inches long; make a small notch downwards at the top of this, then prepare the branch to be inarched after the same manner, but make the slit upwards; fit the tongue of this branch into the notch of the stock, join the rind of one to that of the other, tye them well together with matting, rub on a little clay, to keep out the air, and they will be united in a month, or six weeks. When joined loosen the bandages, but do not remove them until some time after the scions are separated from the parent plant.

Inarching may also be performed with detached cuttings placed in bottles of water, and hung up in the plant intended for a

stock. The origin of this system is due to Mr. Pike, Gardener to J. W. Brereton, Esq. of Brinton, Norfolk, and was first made known to the public through the Gardener's Magazine: this is a very convenient way when only cuttings of the kind to be inarched are in the possession of the propagator, and far more successful than independent grafting or budding.

By Seeds.—Seeds should be sown as soon as ripe. Plunge the pot in heat, and the seeds will vegetate in a month or two; but if the seeds are kept long, they seldom vegetate in less than a year.

Independent Grafting and Budding.—These so seldom succeed that they are scarcely worth describing in this place.

Soil.—The best soil for Camellias is one part heath mould, one part well sifted leaf mould, and two parts brown loam from a pasture. If leaf mould cannot be had, use very rotten dung, and mix a small portion; break the loam and heath mould fine, in preference to sifting it.

Potting.—Always make it a rule to pot each plant immediately after it has done flowering, and before it begins to grow.

If the roots are not matted, merely turn out the plants, and replace them in larger pots; but if matted, break the mass of roots carefully with the hand, and never follow the destructive practice of paring with a knife.

Lay plenty of crocks at the bottom of the pots, and with a flat stick, work the soil well round the sides of the ball.

General Treatment.—In describing the general treatment of the Camellia, we shall divide the year into three seasons. *First,*—That in which they form their young shoots, called the *growing* season, which, if the plants have been flowered in succession, will continue from February to June. *Second,*—The hybernation, or wintering, which continues from June to October. And, *Third,* the flowering season, which continues from October to February.

Treatment in the Growing Season, continuing from February to June.

Heat.—Place the plants, when potted, in a heat not exceeding 75 degrees by day, and 60 by night, until they have formed their young shoots, then immediately increase the temperature 10 degrees, to assist in perfecting their flower buds, which will occupy about a month; afterwards expose them gradually to the air, and

lower the temperature, to prepare them for their summer treatment, which we have termed their hybernation.

The increase of heat mentioned above, to be given whilst the shoots are young and tender, insures abundance of blossom buds.

Watering.—When the plants are potted, and during the whole time they are subjected to a high temperature, syringe, or sprinkle with a rose watering pot, over the leaves, every morning or evening in fine weather, and give a plentiful supply of water at the roots.

Shading.—From the middle of March to the end of September, Camellias are unable to endure a full exposure to the mid-day rays of the sun, which invariably cause the leaves to blotch, and become yellow; always, therefore, throw a net or other slight shade over the glass in sunny weather, from 10 till 3 or 4 o'clock.

Hybernation, continuing from June to October.

Any time from the beginning to the end of June, place the plants out of doors, either under a north wall, or other shelter, where they will get no sun except in the morning and evening, and where they are well sheltered from the wind.

Worms.—Whilst the plants are out of doors worms will occasionally effect an entrance into the pots, unless the pots are placed on a prepared floor, or a piece of slate be put under each. To effectually prevent damage, water occasionally with clear lime water at the roots.

Watering.—In dry weather supply the plants well with water at the roots, and two or three times a week syringe over the leaves.

Treatment in the Flowering Season, continuing from October to February.

Housing.—In the first week in October take the plants into the Greenhouse, or other cool place. As you wish them to come into flower, remove successively into a temperature of 60 or 65 degrees. When the buds are near expanding keep the heat regular, or the buds will fall without opening. When expanded, remove to any light, cool place, and the flowers will continue a long time.

The following selection include most, if not all, the finest in cultivation, to which are attached the usual prices of 1839:

1. Double White. (*C. Jap. alba plena*).—A well known

and lovely variety, growing to the height of 12 or 14 feet, very hardy, and a remarkably free flowerer. Price 3s. 6d.

2. Dr. Siebold's White. (C. Sieboldi). *Syn. candidissima.*—Flowers with a tinge of yellow when first opening, but afterwards becoming pure white; liable to fall before having fully expanded, if placed in too strong a temperature:—flowers measuring nearly four inches when fully expanded. Price 10s.

3. Mr. Wadie's White. (C. Wadieana).—Bluish paper white, petals irregular, measuring, when expanded, 3½ inches. Price 7s. 6d.

4. Fringed Petalled White. (C. fimbriata.)—Delicate white; more irregular in the disposition of its petals than the old double white, and the petals notched or fringed on the upper edge. Price 5s.

5. Welbank's White. (C. Welbankii). *Syn. flavescens.*—The flowers of this variety have a yellow tinge, are remarkably handsome, measuring from 3 to 4 inches diameter when expanded: the plant is a free grower, and flowers abundantly. Price 5s.

6. White Anemone Flowered. (C. anemoneflora alba.—This is a lovely variety, sometimes becoming spotted, or striped, but generally retaining its character as a White Camellia. Price 5s.

7. Semi-double White. (C. semi duplex alba).—This, although not perfectly double, is scarcely surpassed by any of those before it: the flowers are large, usually expanding upwards of 4 inches, of a remarkably pure white, and almost semi-transparent. Price 10s. 6d.

Flowers Variegated.

8. Donklaer's Striped. (C. Donklaeri).—For particulars of this fine variety, see the plate and description.

9. Variegated Flowered. (C. variegata).—This is a very common variety, but is notwithstanding deservedly popular; the flowers are large, red, blotched with white, and very conspicuous. Price 3s. 6d.

10. Chandler's Striped Warratah. (C. Chandlerii). *Syn. versicolor.*—The flowers of this are red, striped and blotched with white. Price 7s. 6d.

11. Pompone. (C. Pomponia). *Syn. Kew Blush.*—Flowers white, tinged with blush at the base, and a red stripe up the centre of each petal: the flowers, when expanded, measure from 3½ to 4 inches across. Price 3s.

12. Presses Eclipse. (C. Eclipsis).—Flowers white, beautifully striped and feathered with pale crimson; petals remarkably regular, and very delicate. Price 5s.

13. The Showy. (C. speciosa). *Syn. C. Rawesiana.*—Flowers deep red, striped with white; measures, when expanded, nearly 4 inches. Price 10s. 6d.

14. The German Rose. (C, Francofurtensis).—This is a new variety. The flowers are large, sometimes nearly 6 inches in diameter; the petals are light rose, striped and blotched with dark crimson. Price 21s.

15. Parks's Striped Rose. (C. Parksii).—The ground colour of the flowers is a delicate rose, with here and there blotches and stripes of white. Price 10s. 6d.

16. Gray's Invincible. (C. punctata). *Syn. Dotted White.*—Flowers very pale red, nearly white, striped with deep red, like a carnation. Price 7s. 6d.

17. Lady Wilton's. (C. Wiltoni).—Flowers blush, striped and dotted with a darker colour. Price 7s. 6d.

18. The Rose of the World. (C. Rosa Mundi).—The flowers of this have a white ground, spotted and striped with crimson. Price 5s.

19. Sweet's Painted Lady. (C. Sweetiana).—This, with the exception of the Donklaeri, is perhaps the finest variegated variety we have in our collections; the flowers are large, very double, and the white, dark red, and light red, are so beautifully mixed, as to give the plant, when in flower, a very lively and elegant appearance. Price 10s. 6d.

20. Miss Thompson's. (C. Susanna).—This is something like the Painted Lady, but rather inferior to it; the stripes are faint, and the contrast on the white ground is not so conspicuous. Price 10s. 6d.

21. Colvill's. (C. Colvillii).—This is another, bearing a great resemblance to the Painted Lady: the petals are beautifully striped with red, almost like a carnation. Price 10s.

22. Martha. (C. Martha).—The colour of this flower is pale blush, striped with a darker colour. Price 10s. 6d.

Light Red, or Blush.

23. Flesh Coloured. (C. incarnata). *Syn. Lady Hume's Blush.*—The petals of this variety are a rich and delicate rose

colour. The plant bears the climate of Ireland well, and requires little protection in England. Price 3s. 6d.

24. Chinese Rose. (C. Rosa Sinensis).—Flowers nearly 4 inches diameter, pale red, with dark purplish veins; a very free flowerer, and well deserving cultivation. Price 5s.

25. Chandler's Elegant, (C. elegans).—Flowers much like the last in colour, but scarcely so large: form of the flowers like the anemonæ flora. Price 10s. 6d.

26. Middlemist's Rose. (C. carnea). *Syn. Flesh Coloured, Rose Coloured.*—This is not very double, but a beautiful kind; the veins on the petals purple. Price 5s.

27. Kent's Thick Nerved. (C. crassinervis). *Syn. hexangularis.*—Flowers the same shape as the anemonæ flora, but the colour paler, and in other respects very distinct. Price 7s. 6d.

28. Coral-flowered. (C. corallina).—This is another Anemone flowered, with petals semi-transparent, and very beautiful. Price 5s.

29. Woods's. (C. Woodsii).—Flowers large, nearly 4 inches broad, but not very double. Price 7s. 6d.

30. Rosy. (C. rosea).—Flowers measuring upwards of 3 inches broad, very handsome. Price 3s.

Dark Red.

31. Dark Red. (C. atrorubens). *Syn. Loddiges Red.*—A beautiful variety; flowers deep scarlet. Price 5s.

32. Old Double Red. (C. rubro-plena). *Syn. Grevilles Red.*—Flowers crimson. This is a well-known variety, but has of late become somewhat scarce in collections, probably from its not flowering so freely as some of the other kinds. To make it produce flowers, cripple it at the roots with a small pot, give it plenty of heat at the season of forming the buds, and as soon as these are fully formed, place it entire in rather a larger pot, and in general it will flower freely. Price 3s. 6d.

33. Crimson Shell. (C. imbricata).—This has been reputed as the finest variety in cultivation. Although we can scarcely assent to this, yet it is without doubt a lovely kind; the colour is a rich carmine, very conspicuous amongst the deep green leaves. Price 7s. 6d.

34. Hollyhock Flowered. (C. althæa flora).—Flowers not so deep coloured as the three preceding, but is a good variety. Price 7s. 6d.

35. Anemone Flowered. (C. anemone flora). *Syn. Waratah.*—This is a well known old, but very excellent variety: it is a very free flowerer, of a deep crimson red, and remarkably showy. Price 5s.

36. The Choice. (C. eximia).—Flowers are large, but paler coloured than the Anemone Flowered. Price 7s. 6d.

37. Cluster Flowered. (C. florida).—Flowers upwards of 3 inches across, fine dark rose coloured, resembling the Waratah. Price 7s. 6d.

38. Allnut's Splendid. (C. splendens). *Syn. coccinea.*—Flowers remarkably profuse, brilliant scarlet, very showy, one of the very best kinds. Price 5s.

39. Carnation Waratah. (C. insignis). *Syn. The Remarkable, Chandler's Splendid.*—Flowers large and conspicuous, of a fine deep rosy red. Price 7s. 6d.

40. Knight's. (C. Knightii).—A very fine kind, but the flowers not so large as some of the forementioned. Price 7s. 6d.

41. Ross's. (C. Rossii). *Syn. gloriosa.*—Flowers dark red, measuring nearly 4 inches broad; a fine variety. Price 7s. 6d.

42. Expanded Flowered. (C. expansa).—Flowers dark red, very showy, and produced in abundance. Price 7s. 6d.

43. Aucuba Leaved. (C. aucubæ folia).—Flowers much like the last, but the appearance of the plant is very different. Price 7s. 6d.

44. The Neat. (C. concinna).—Flowers deep rose colour, not so showy as some of the others, but a kind well deserving extensive cultivation. Price 10s. 6d.

45. Red Pæony Flowered. (C. pæonia flora.—Is a free flowering variety, common in most collections. Price 3s. 6d.

The above are a selection of the best that have come under the observation of ourselves and our friends. The following may be added, for the use of those who are anxious to make a full collection. Many of these we are unacquainted with,—others we have in our possession, but they have not yet flowered:—

C. japonica Elphinstoniana, 7s 6d.
..... delicatissima, 20s.
..... Pæonia flora alba, 5s.
..... Pæonia flora, Rosea, 5s.
C. japonica violacea superba,
..... Cliveana.
..... Spofforthiana, 20s.
..... hybrida.
..... argentea.

C. japonica Gilesii, 30s.
..... triumphans, 30s.
..... semiduplex.
..... Sabiniana, 10s. 6d.
..... involuta.
..... Conspicua.
..... princeps.
... . longifolia.
..... Dorsettii.
..... decora.
..... rotundifolia.
..... Palmerii.
..... Reevesii, 5s.

C. japonica pendula.
..... superba.
..... Gunnelli.
..... Pronayana.
..... Aitonii, 7s. 6d.
..... Epsomensis.
..... Pressii.
..... flora alba.
..... anemoneflore rosea, 5s
..... rubro-punctata.
.. .. myrtifolia.
..... Alnuttii alba.
..... rosa-striata.

The greater part of the above kinds may be obtained of our friend, Mr. Cunningham, Nurseryman, Liverpool, and several other Country Nurserymen; Mr. J. Cunningham, Comely Bank, Edinburgh; and at most of the principal Nurseries around London.

Where only a few kinds can be grown, and it is wished to purchase at a small cost, the following are excellent varieties, and not very expensive:—

White Flowered.

Double White, 3s. 6d.
Welbank's White, 5s.
White Anemone Flowered, 5s.
Fringed-petalled, 5s.

Variegated Flowered.

Presses Eclipse, 5s.
Rose of the World, 5s.
Pompone, 3s.
Variegated, 3s. 6d.

Light Red.

Chandler's Elegant, 7s. 6d.
Rosy, 3s.
Coral Flowered, 5s.
Chinese Rose, 5s.

Dark Red.

Old Double Red, 3s.
Waratah, 3s. 6d.
Old Dark Red, 5s.
Red Pæony Flowered, 3s. 6d.

The above selection (not of the choicest it is true, but yet very fine varieties,) may be purchased for about £3 10s. These obtained and propagated, about 6 of each kind, will form, when in flower, a beautiful diversity.

If it is desirable to add a few of the choicest kinds to the above, the following are amongst the best:—

Donklaer's. See Plate.
Spofforth, 20s.

Colville's, 10s.
Sweet's Painted, 10s.
Sabini, 10s. 6d.
Triumphant, 30s.
Very Delicate, 21s.
Gilesii, 30s.
Showy, 10s. 6d.

Besides the varieties of the C. Japonica, all the species of this fine genus are deserving of all the attention that can be paid to them,—as

C. reticulata. C. maliflora. C. euryoides.
C. sesanque. C. oleifera. C. Kissi.

All the varieties of C. japonica grow freely in a common frame, if the pots be set on a dry floor. Just treat the plants as recommended above; and when it is wished to bring them into flower, remove them in succession into the window of a warm room.

Much has been written on growing Camellias in the open borders in Ireland. We fear they would never prosper: all we have seen, either in England or Ireland, appear stunted. Some at Narrow Water, after standing out several years, showed no disposition to flower. We took them up, and the following year they flowered freely.

PROPAGATION OF STOVE SHRUBS.

Shrubby Stove Plants may be increased several ways;—as by Cuttings, Layers, Grafting, Budding, and Seeds.

Cuttings may be divided into 5 kinds:—those of one year old wood, called ripened cuttings;—those of the young wood, when it first begins to harden, called half ripe cuttings;—those of the tender shoots, called cuttings of the young wood;—those formed by pieces of the roots;—and those by buds or leaves.

Both ripened and half-ripened cuttings may be cut in such lengths as are most suitable to the nature of the plants, but always at a joint. Cuttings of the young wood are best when split off from the old, as soon as they have attained the desired length: dress the lower end with a sharp knife, without removing the whole of the old wood.

If either ripened, half-ripened, or young cuttings be put in, it is indispensible that the leaves of evergreen species remain entire, or nearly so, and none be taken off, except from the part of the cuttings to be inserted in the pot. One half the failures in propagation arise from a want of due precaution on this point.

If the leaves on any of the cuttings are large and spreading, rather than cut them off plant the cuttings singly, or very few in a pot.

Until the cuttings of stove plants have began to form roots, their life is so feeble that they are unable to endure powerful light; and from the small quantity of nourishment on which they are obliged to subsist, they have but little moisture to evaporate; so that open exposure to dry air is always injurious, and to tender kinds often fatal. Both these causes of failure are prevented by covering the cuttings with a glass: for the greater part a good hand glass will answer perfectly well, but some must have a bell glass.

Most of the hard-wooded kinds strike the readiest in fine sand, some in light soil, others merely stuck in the tan of a pine bed, and others in bottles of water.

The best soil for those kinds requiring mould, is composed of equal parts of leaf mould, heath mould, and sand; the two first to be finely sifted.

By leaf mould is meant, the soil produced by leaves totally rotted down; and by heath mould, the black soil found in dry situations, where the common ling or heather (Erica vulgaris) grows. Although, from its colour, it generally goes by the name of peat and bog, yet it is precisely opposite, both in its nature and effects: bog earth is always found in situations well saturated with wet; heath mould in very dry places.

Whatever rules are laid down for propagation, the operator must exercise his own judgment in most cases, for if ripened cuttings are too hard and old, they are incapable of drawing sufficient nourishment to support themselves; and if the young ones are too soft and tender, they will be liable to perish with over nourishment. No certain line can therefore be drawn applicable to all plants, for even in the same natural order, where the general habits are alike, the cuttings widely differ, in their readiness to strike root, under the same kind of treatment.

The following selection of Genera, which include the greater part of those deserving cultivation in the stove, are so divided, that reference to any of them may be made in one minute.

Those requiring to be plunged in heat, may have the pot sunk to the rim either in a pine pit, or a common dung hot-bed; but if in the latter, care must be taken that no rank steam can approach them, or the loss is certain.

1 2

Acarus holosericus p 15. 62

Thunbergia alata alba

Manettia glabra

Red Spider

acarus telarius p 15. 62. 106

H. Del.

W. Mayhew Liverpool. S

Those not requiring to be plunged may be set in any warm situation, where they will not dry too quickly,—on the top of a bark bed, or on the soil in a hot-bed frame; but for some of the species the moisture of a hot-bed is too great.

Where there is any peculiarity in the treatment of the following Genera, the Culture and Propagation will be treated on at large hereafter. These are marked thus, (*a*).

I.—Selection of Genera, the Cuttings of which require to be planted in pots of fine sand, and covered with a glass:—

1.—To be Plunged in Heat.

a. Ripened Cuttings.

a Achras, *fruit,*
a Adansonia, *fruit,*
Adenanthera,
a Ægle, *fruit,*
Aleurites,
a Astranthus,
a Aubletia,
a Averrhoa, *fruit,*
Banisteria,
a Barringtonia,
a Blighia, *fruit,*
a Brosimum,
a Brownea,
Bucida,
Bursera,
a Butea,
Calophyllum,
Canarium,
a Carica, *fruit,*
Canella, *util.*
a Caryophyllus, *util.*
Carapa,
a Chrysophyllum, *fruit,*
a Cinchona, *util.*
Citriobatus,
a Cinnamomum, *util.*
a Cookia, *fruit,*
Codarium,
Comocladia,
a Crescentia, *fruit,*
Cossignea,
Curatella,
Cupania,
Cynometra,
Cyminosma,
a Dillenia,
a Diospyros, *fruit,*
a Drymys, *util.*
Dipteryx, *util.*
a Durio, *fruit,*
a Embryopteris, *fruit,*
Elæodendron,
a Eugenia, *fruit,*
a Euphoria, *fruit,*
a Garcinia, *fruit,*
Galphimia,
Gaudichaudia,
Godoya,
Grangeria,
Guatteria,
Guaiacum, *util.*
a Gustavia,
Hiræa,
Heritiera,
Heteropteris,
Hura,
a Icica,
a Imbricaria,
Johnia,
Jonesia,
Jossinia,
Kleinhofia,
Kirganelia,
Lagetta,
Leonia, *fruit,*
Lophira,
Lecythis,
a Lucuma, *fruit,*
a Mangifera, *fruit,*
Marlea,
a Melicocca, *fruit,*
a Melanhorræa, *util.*
a Micranthera,
Metrosideros,
a Mimusops, *fruit,*
Moronobea,
a Monodora,
a Myristica,
Norantea,
a Nycteristion, *fruit,*

Omphalobium,
Paullinia,
a Parinarium, *fruit,*
a Pentadesma, *fruit,*
a Persea, *fruit,*
a Pinus,
a Pimenta, *util.*
Pittosporum,
Poupartia,
a Quassia, *util.*
Ryanea,
a Sapindus, *util.*
a Schinus,
Schmidelia,
Schœfferia,
Senacia,
Sethia,
Sloanea,
a Spondias, *fruit,*
a Sterculia,
Stephania,
Stravadium,
a Syzigium,
Tamarindus, *fruit,*
Tabernæmontana,
a Tectona, *util.*
Terminalia,
a Theobroma, *util.*
a Theophrasta,
Thryallis,
Tonsella,
Toddalia,
Triopteris,
Trigonia,
Tripinnaria,
Turpinia,
Vochysia,
Vouapa,
Ximenea.

b Half-ripened Cuttings.

Abuta,
Abroma,
Abrus,
a Acacia,
Ayenia,
a Bauhinia,
a Bixa, *util.*
a Bombax,
a Brexia,
Brunsfelsia,
Brya, *util.*
a Buchanania, *fruit,*
Bunchosia,
Burchellia,
Cadia,
a Cæsalpinia, *util.*
Capraria,
Careya,
a Carolinea,
a Carissa, *fruit,*
Casearia,
Cassia,
Catalpa,
a Catesbæa,
a Ceanothus,
Cedrela,
Cephaelis,
a Cerbera,
a Chiococca,
a Chloranthus,
Chomelia,
a Cissampelos,
a Citharexylum,
a Clusia,
Colebrookia,
Commersonia,
Conocarpus,
Conocephalus,
Cordia,
Cornutia,
a Cratæva, *fruit,*
Crossandra,
Cynanchum,
Dalechampia,
Dissolena,
a Duranta,
a Echitis,
a Erythrina,
a Exostemma,
Fagara,
a Flacourtia, *fruit,*
Flemingia,
Flindersia,
Gærtnera,
a Gardenia,
a Genipa,
Geoffroya,
Getonia,
Gmelina,
Gomphia,
Grewia,
Guettarda,
a Guilandina,
a Hæmatoxylon, *util.*
Hamelia,
Hemidesmus,
Hillia,
Hippocratea,
a Hippomane,
a Hymenæa,
a Hymenodyction,
Ichnocarpus,

a Jacaranda,
a Jacquinia,
Jasminum,
Jonidium,
a Kydia,
Lætia,
a Lagerstræmia,
Lawsonia,
Lebretonia,
Limonia, *fruit,*
Linociera,
a Lisianthus,
Ludia,
Macronemum,
Mæsa,
a Melaleuca,
a Melicocca, *fruit,*
Melodinus,
a Millingtonia,
a Monetia,
Morinda,
Muntingia,
Myginda,
a Myrcia,
Myrodia,
Nageia,
Nauclea,
a Nelitris, *fruit,*
a Nephelium, *fruit,*
Niebuhria,
a Nyctanthes,
Ochna,
Ochroma,
Omphalia,
Ophioxylon,
Oxyanthus,
Oxystelma,
a Panax,
Pavetta,
Pavonia,
a Pergularia,
Petræa,
Phyllanthus,
a Piscidia,
Plumbago,
a Portlandia,
Posoqueria,
Prockia,
Psidium,
Psychotria,
Pterospermum,
a Quisqualis,
Quivisia,
Randia,
Rauwolfia,
Richiea,
Rondeletia,
Rottlera,
Ruyschia,
Samyda,
Sapium,
a Sarcocephalus, *fruit,*
Sarcostemma,
a Schotia,
Securidaca,
Securinega,
Seriana,
a Sesbana,
a Sideroxylon,
a Siderodendron,
Simaba, *util.*
Simaruba, *util.*
Sophora,
a Stilago, *fruit,*
Stillingia, *util.*
Strophanthus,
a Strychnos, *util.*
a Tachygalia,
a Tetracera,
Trewia,
Trichilia,
a Triphasia, *fruit,*
Triumfetta,
a Trophis,
Uncaria,
a Vangueria, *fruit,*
Ventilago,
Vismea,
Vitex,
a Walkeria,
Webera,
Weinmannia,
a Wormia,
Wrightia,
a Xanthochymus,
a Xylophylla.

c Cuttings of the Young Wood.

a Aglaia,
a Andromeda,
a Annesleia,
Boscia,
a Brownlowia,
a Cajanus, *util.*
Canavalia,
a Capparis, *util.*
a Chætocalyx,
a Chilopsis,
a Coulteria,
Crotalaria,

Crudya,
a Cryptolepis,
Cryptostegia,
Cylista,
Dalbergia,
Daubentonia,
Dæmia,
Desmanthus,
a Desmodium,
Dicerma,
Diplochita,
Diplolepis,
Dombeya,
Drepanocarpus,
Ecastaphyllum,
Entada,
a Erythrophleum,
Evodia,
a Fagræa,
Gagnebina,
a Galactia,
Galipea,
Ginoria,
a Glycine,
a Grislea,
Hæmadictyon,
Hardwickia,
Haronga,
a Harrisonia,
a Hedysarum,
Heterotrichum,
Heylandia,
a Indigofera,
a Inga, *fruit,*
Lasiandra,
Lettsomia,
Lonchocarpus,
Lopimia,
a Loreya,
Majeta,
Manettia,
Matayba,
a Melastoma,
Melochia,
a Memecylon,
Meriania,
Metastelma,
a Miconia,
Microlicia,
a Mimosa,
Moringa,
Mourirea,
a Mucuna,
Mullera,
a Myrospermum, *util.*
a Naravelia,
Neurocarpum,
Nissolia,
Nonatelia,
Ophioriza,
Ormocarpum,
Ormosia,
Outea,
Parivoa,
Parkia,
a Parkinsonia,
Pentaptera,
Pictetia,
Pleroma,
a Poinciana,
Poiretia,
Pongamia,
Prosopis,
Pterocarpus, *util.*
Pueraria,
Requienia,
Rudolphia,
Sarcolobus,
Sciodaphyllum,
a Spathodeæ,
Stylosanthus,
a Tephrosia,
a Teramnus,
a Ternstræmia,
Tetranema,
Tiliacora,
Tococa,
Tylophora.

2.—To be Planted in Sand, and not Plunged in Heat.

a Ripened Cuttings.

a Boswellia, *util.*
a Bumelia,
a Calyptranthes,
Carpodontos,
a Chrysobalanus, *fr.*
a Cicca, *fruit,*
a Coccoloba, *fruit,*
Colbertia,
a Copaifera, *util.*
a Elæocarpus,
a Eugenia, *fruit,*
a Feronia, *fruit,*
Garuga,
a Grevillia,
Gyrocarpus,

a Hernandia, *util.*
Hirtella,
Hugonia,
a Inocarpus, *fruit,*
Maba,
a Santalum, *util.*
Saurauja,
a Schotia,
Tetradium.

b Half-Ripened Cuttings.

a Columnea,
a Fernelia,
Heliocarpus,
Mappa,
Plunkenetia,
a Polyspora,
Rhopalea,
Urena.

c Cuttings of Young Wood.

a Calotropis,
a Selloa.

II.—Selection of Genera, the Cuttings of which require to be planted in pots of soil, and covered with a glass :—

1.—To be Plunged in Heat.

a Ripened Cuttings.

a Anacardium, *fruit,*
a Anona, *fruit,*
a Antidesma,
Aralia,
a Artocarpus, *fruit,*
Artabotrys,
Astronium,
Atalantia,
Avicennia,
a Baphia,
a Balsomodendron, *ut.*
Blackwellia,
Blakea,
Brucea,
Buttneria,
Callicarpa,
a Chierostemon,
a Coffea, *util.*
Elæagnus,
Eurya,
a Ficus, *fruit,*
Freziera,
Glycosmis,
a Gossypium, *util.*
Gouania,
a Grias, *fruit,*
Guarea,
Heynea,
a Isertia,
a Laurus, *util.*
a Limonia, *fruit,*
a Mahurea,
a Malpighia, *fruit,*
a Mammea, *fruit,*
a Melia, *util.*
a Michelia,
a Monodora, *util.*
a Morisonia,
Murraya,
Nycterium,
Olax,
Quivisia,
Sandoricum,

b Half-Ripened Cuttings.

Acanthus,
Achania,
Achyranthus,
Actinophyllum,
Adelia,
Ægiphila,
Ærua,
Alanguim,
a Allamanda,

Alyxia,
a Amerimnum,
a Argyreia,
Asclepias,
Azimia,
Begonia,
Berrya,
Bontia,
Bourreria,
a Brugmansia,
a Bubroma,
Cissus,
Cleome,
a Clitoria,
a Cocculus, *util.*
a Combretum,
a Croton, *util.*
a Dolichos, *util.*
Ehretia,
a Eranthemum,
Eriodendron,
Eriolæna,
Gaya,
Guazuma,
a Helicteres,
a Hibiscus,
a Holmskioldia,
Justicia,
Lantana,
Leea,
a Melhania,
Mikania,
Mussænda,
a Myrtus,
Neurolæna,
a Olisbæa,
Pentapetes,
Petiveria,
Philoxerus,
Phytolacca,
Pisonia,
Psiadia,
Richardsonia,
Riedleia,
a Ruellia,
a Russelia,
Salvia,
Sida,
a Siphonia, *util.*
Smeathmannia,
Solanum,
Stemodia,
Tamarix,
Teucrium,
Thespesia,
Tournefortia,
Turnera,
Verbesina,
Vinca,
Volkameria,
Witheringia,
a Zizyphus, *fruit.*

c Cuttings of the Young Wood.

a Aphelandra,
a Arthrostemma,
a Astrapæa,
Barleria,
Bourreria,
Bignonia,
Bœhmeria,
Bœrhaavia,
a Bouvardia,
Calyptrion,
a Clematis,
a Clerodendron,
a Clidemia,
a Conostegia,
Cremanium,
Dicliptera,
Excæcaria,
a Gardoquia,
Gastonia,
a Geissomeria,
Gnetum,
Hypœstis,
a Ipomæa,
Malvaviscus,
Modecca,
a Murucuja, *fruit,*
Nicolsonia,
Osbeckia,
Ossæa,
Oxyspora,
Pachyrhizus
a Pæderia,
a Pelargonium,
Periptera,
Petrobium,
Phaylopsis,
Pogostemon,
Sagræa,
Salmea,
a Scævola,
Spennera,
a Stachytarpheta,
Tecoma,
Tetrazygia,
Thunbergia,
Tibouchina,

2.—To be Planted in Soil, and not Plunged in Heat.

a Ripened Cuttings.

Bassia, Daphne, Fœtidia.
Cecropia,

b Half-Ripened Cuttings.

Gonolobus, Rivina, Secamone,
Gymnema, Rolandra, *a* Talinum,
a Ixora, Rubus, Tragia.

III.—Succulents, the Cuttings of which, after separation from the parent plants, require to be more or less dried previous to planting, and neither to be covered with a glass, plunged, or placed in a moist heat.

1.—To be Planted in Pots of fine Sand.

Gonostemon, Piaranthus, Talinum.
Huernia,

2.—To be Planted in Pots of Soil.

Cactus, Euphorbia, Piaranthus,
Caralluma, Mammillaria, Podanthus,
Cacalia, Melocactus, Rhipsalis,
Calandrinia, Opuntia, Sinningia,
Cereus, Orbea, Tridentea,
Dischidia, Pereskia, Tromotriche.
Epiphyllum,

3.—Not to be Potted, but the Ends stuck in a dry warm Tan Bed.

a Jatropha, *a* Solandra, Pedilanthus,
a Janipha, *a* Euphorbia, Plumeria.
Besleria, Dracæna,

IV.—Plants which may be readily propagated by the leaves being taken off and inserted in, or even laid on, the top of a pot of fine soil.

a Bryophyllum, *a* Calenchoe. *a* Brexia

V.—Plants which are often increased by Cuttings of the Roots.

Ailanthus,	*a* Clerodendron,	Tecoma,
Ardisia,	*a* Combretum,	*a* Poivra.

PROPAGATION OF STOVE PERENNIALS.

By Perennials are to be understood all plants, the stems of which die down to the roots, either wholly or in part, every year; their buds being produced chiefly beneath the surface of the ground; and the roots continuing to re-germinate for several years successively.

Perennials are of several kinds; viz.—1, *Herbaceous plants*, properly so called, which are, for the most part, fibrous rooted. These are increased by division with a knife, and many are also easily propagated by cuttings.—2, *Tuberous rooted*: having underground fleshy bodies, connected by slender fibres: these are propagated by separating and planting the tubers.—3, *Bulbous rooted*: plants possessing true bulbs; offsets from which are formed at the sides every year, by which they are propagated.—4, *Fusiform rooted*: these must either be grown from seeds or cuttings.

Herbaceous plants are of two kinds,—DECIDUOUS and EVERGREEN. The *deciduous* ones, and a few of the evergreen kinds, are increased by dividing the root with a sharp knife, just at the season when the plants are beginning to grow, after their state of torpidity. Pot the divided parts in the same kind of soil as the parent plants require; give them a little water, and when they begin to grow treat them precisely as old plants.

The evergreen herbaceous plants for the most part throw up suckers from the sides of the roots, or on the stems: when this is not the natural habit of the species, divide at the roots in the same manner, and at the same season as recommended for deciduous kinds.

Suckers may be taken off whenever they appear, and are large enough for separation; but the best time for the purpose is when the plants are beginning to grow, after the season of torpidity.

After separation, allow the more fleshy kinds to lay for a day or so, in a dry, shady place, to cauterize the wounds, or the damp-

ness of the mould might cause them to perish; but species that are not very fleshy, may be potted immediately, in the same soil as the parent plants.

When potted, be careful not to expose them either to a very dry air, or too much light, until they have begun to grow; as from the very feeble support they derive, such exposure might prove fatal.

Bulbs. Separate the offsets at the time of potting, when the season of torpidity ends, and put them in a light rich soil.

In potting a bulb never place the crown deep under the surface of the soil, it is better that it should be rather shallow and even exposed than otherwise, for too much moisture on the crown invariably injures, and in many cases destroys vegetation.

When potted, give little or no water until the bulbs begin to vegetate, then supply them at first sparingly, but as they increase in growth, let the supply of water be increased in proportion.

Tubers may be planted and treated as recommended for bulbs; but the roots are not injured by being inserted moderately deep under the surface of the mould.

Cuttings. Follow in most particulars the same rules as recommended for soft-wooded trees and shrubs, viz.—

1. Use very sandy light soil in which to plant the cuttings. If the soil is not naturally light and sandy, make it so by the addition of sand.

2. Plunge the pots in a brisk moist heat, and never allow them to have air, or be exposed to much light, until they have begun to grow.

3. Water very sparingly until they have struck root, for any over watering will gorge them, and immediate death will follow.

If the heat in which they are placed is lively and moist, they will not require to be covered with a glass, but otherwise a hand or bell glass would assist their growth.

By *Half-ripe Cuttings* is meant cuttings made from the stems when full grown, and immediately after the flowers have fallen.

Cuttings of the Young Wood are to be separated when the stems have grown a sufficient length from the root, and have become strong enough to stand upright when planted.

Seeds.—Sow the seeds early in Spring, at the same time and in the same manner as Annuals; transplant when large enough, and finally pot off, and treat as old plants.

In the propagation of Stove Perennials, the following divisions will be of use :—

I.—List of Genera, the species of which are increased by dividing the roots :—

Alpinia,
Amomum,
Aneilema,
Anguria,
Anemia,
Aphanochilus,
Arum,
Barbacenia,
Buonapartea,
Caladium,
Calathea,
Callisia,
Canna,
Cartonema,
Ceropegia,
Cheilanthus,
Commelina,
Costus,
Curcuma,
Dichorizandra,
Dracontium,
Elletaria,
Eupatorium,
Filices,
Globba,
Hedychium,
Heliconia,
Hellenia,
Herreria,
Houttuynia,
Kæmpferia,
Littæa,
Lobelia,
Mantisia,
Maranta,
Marica,
Mariscus,
Nothochlæna,
Peliosanthus,
Phrynium,
Roscœa,
Streptocarpus,
Tacca,
Thalea,
Tradescantia,
Tupistra,
Xerophyllum,
Xiphidium,
Zingiber.

II.—Genera, the species of which throw up Suckers, by which they are propagated :—

Agave,
Aloe,
Aspidistra,
Barbacenia,
Bambusa,
Billbergia,
Bœrhaavia,
Bromelia,
Caraguata,
Carludovica,
Crinum,
Doryanthes,
Dorstenia,
Furcrœa,
Guzmannia,
Musa,
Pandanus,
Pitcairnia,
Pothos,
Pourretia,
Sanseviera,
Saccharum,
Strelitzia,
Tillandsia,
Urania,
Vellosia,
Yucca.

III.—Genera, the species of which are increased by offsets :—

a Bulbous Rooted.

Amaryllis,
Brunsvigia,
Crinum,

Eurycles,
Gloriosa,
Griffinia,
Hæmanthus,
Ismene,
Millea,
Moræa,
Pancratium,
Phycella,
Polianthes,
Zephyranthus.

b Tuberous Rooted.

*a*Alstromeria,
Curculigo,
Dioscorea,
Gesneria,
Gloxinia,
Trevirana.

IV.—Species, which may be propagated by Cuttings :—

a Half Ripe Wood.

Aspicarpa,
Blechum,
Calandrinia,
Clitoria,
Dichorizandra,
Dalea,
Hemimeris,
Herreria,
Ipomæa,
Lipostoma,
Lobelia,
Morenoa,
Mikania,
Nelsonia,
Peperoma,
Phytolacca,
Phyllolobium,
Priva,
Ruellia,
Sesuvium,
Salvia,
Streptium,
Sphæranthus,
Viguiera,
Xerophyllum.

b Young Wood.

Brachystelma,
Bryonia,
Evolvulus,
Gesneria,
Lipostoma.

V.—Genera, the species of which usually produce seeds freely, by which they are readily increased :—

Alternanthera,
Alströmeria,
Bœrhaavia,
Buonapartea,
Bryonia,
Campelia,
Clorophytum,
Clitoria,
Drymaria,
Elephantopus,
Heylandia,
Hibiscus,
Ipomæa,
Momordica,
Pentacrypta,
Stylosanthus,
Vernonia.

LIST OF STOVE PLANTS

FOR A SMALL COLLECTION, WHERE ONLY CHOICE ONES ARE DESIRABLE.

1.—STOVE FRUITS DESERVING CULTIVATION FOR TABLE:—

Achras sapota
..... sapotilla
Ægle marmelos
Anona Cherimoyer
..... squamosa
..... muricata
..... punctata
..... reticulata
..... senegalensis
..... longifolia
..... palustris
Averrhoa acida
Blighia sapida
Buchanania latifolia
..... angustifolia
Carica microcarpa
..... papaya
Chrysophyllum Cainito
..... Jamaicensis
..... cæruleum
..... microphyllum
..... argenteum
..... macrophyllnm
Carpodinus dulcis
Cratæva Tapia
Cookia punctata
Chrysobalanus Icaco
Durio zebethinus
Eriobotrya japonica
Eugenia macrophylla
.... mallaccensis
..... aqua
..... Jambos
Euphoria Litchi,
..... Longana
Flacourtia sapida
Feronia elephantum
Garcinia mangostana
Grias Cauliflora
Hovenia dulcis
Inga marginata
Lucuma mammosa
..... Bonplandii
..... obovata
..... salicifolia
Lansium domesticum
Leonia glycycarpa
Memecylon edule
Mimusops Elengi
..... dissecta

Mammea americana
Malpighia urens
Mangifera indica
Musa Cavendishia
..... chinensis
Nelitris Jambosella
Nycteristion ferrugineum
Persea gratissima
Psidium Cattleyanum
Pierardia sapida
Sandoricum indicum
Sarcocephalus esculentus
Spondias dulcis
..... purpurea
Spondias mangifera
Unona esculenta
Vanguiera edulis
Varronia alnifolia
Willughbeia edulis
Xanthochymus dulcis
..... pictorius
..... macrophyllus
..... purpureus
..... ovalifolius
..... luteus
..... guineensis
..... tinctorius

2.—PLANTS USED FOR DOMESTIC AND OTHER PURPOSES, DESERVING CULTURE FOR ORNAMENT:—

Alstrœmeria Salsilla
Acacia arabica
..... farnesiana
Alpinia galanga
..... Cardamom
Balsamodendron Zeylanica
..... guileadensis
Bambusa arundinacea
Boswellia serrata
Brosimum alicastrum
..... spurium
Caryophyllus aromaticus
Caryocar nucifera
..... glabrum
Canna edulis
Cœsalpinia Sappan
Cœsalpinia brasiliense
Cassia lanceolata
Cinnamomum verum
.....cassia
.....camphora
.....nitidum
Copaifera officinalis
Coffea arabica
Cinchona officinalis
Croton Tiglium
Curcuma Zerumbet
..... amada
..... longa
Caladium esculentum
Callicocca Ipecacuanha
Dioscoria bulbifera

Dioscoria braziliense
Drimys wintera
Ficus elasticus
..... religiosa
..... indica
Galactodendron utile
Gossypium arboreum
Guaiacum officinalis
Hibiscus esculentus
Indigofera argentea
Inocarpus edulis
Ipomæa Batatas
..... Jalapa
Jatropha Manihot
Kempferia Galanga
Melhania Erythroxylon
..... Melanoxylon
Mucuna urens
Maranta arundinacea
Myristica moschata
Melanorrhæa usitata
Pimenta vulgaris
Parinarium excelsum
..... macrophyllum
Physalis peruviana
Pentadesma butyracea
Piper Betel
..... nigrum
..... longum
Quassia amara
Sapindus saponaria
Stellingia sebifera
Saccharum officinalis
Santalum album
Soja hispida
Sweetiena Mahagoni
Theobroma Cacao
Tectona grandis
Tacca pinnatifida
Vanilla aromatica
Zingiber officinalis

The culture of Tropical Fruits and Plants of Commerce, Medicine, and Domestic purposes will be treated on at large in a separate volume, wherein Plates will be given of those most deserving of culture.

3.—SELECTION OF PALMS FOR THE STOVE.

a Dwarf, suitable for a common Plant Stove, the tallest not exceeding 15 feet high.

Astrocaryum acaule
..... campestre
Areca humilis
Attalia humilis
Chamædorea gracilis
..... fragrans
Chamærops gracilis
Corypha tectorum

Cycas revoluta
..... circinalis
Desmonchus dubius
..... polycanthus
..... americanus
Diplothemium campestre
..... maratima
Elate Sylvestris
Geonoma acaulis
..... pinnatifrons
Latania rubra
..... glaucophyllum
Livistonia inermis
..... humilis
Licuala peltata
..... spinosa, *util.*
Nipa frutescens
Phœnix acaulis
..... pygmæa
Rhapis flabelliformis
Sabal Blackburniana
..... Adansonia
..... umbraculifera
Thrinax parviflora, *util.*
Zamia pungens
..... horrida
..... spiralis

b Tall, requiring a lofty house to grow them to perfection, growing from 20 to 150 feet.

Areca Catechu
..... humilis, *util.*
.....Oleracea, *util.*
Astrocaryum aculeatum
..... vulgare
Acrocomia minor
..... tenuifolia
..... sclerocarpa
Attalia excelsa
..... speciosa
Bactris major
Borassus flabelliformis
Caryota urens
Cocos nucifera, *util.*
..... plumosa
Calamus verus, *util.*
..... rudentum, *util.*
..... niger, *util.*
Corypha umbraculifera, *util.*
Corypha elata
Corypha glaucescens
Elœis occidentalis
..... pernambucana
Euterpe globosa
..... caribæa.
Gomutus saccharifer
Hyphœne coriacea
Latania borbonica
Leopoldina pulchra
Maximiliana regia
Mauritia vinifera
Manicaria saccifera
Œnocarpus Batava
Phœnix dactylifera, *util.*
..... farinifera
Sagus Rumphii, *util.*
..... vinifera
Taliera bengalensis.

SELECTION OF STOVE SHRUBS,

WITH THE TIME OF FLOWERING, AND COLOURS OF THE FLOWERS.

Aphelandra cristata,	scarlet,	May,	splendid.
Ardisia, colorata,	red,	July,	beautiful.
Astrapæa Wallickii,	scarlet,	July,	very splendid.
Barringtonia speciosa,	scarlet,	April,	very splendid.
Beaumontia grandiflora,	white,	June,	fine species.
Bejaria glauca,	purple,	June,	handsome.
Bouvardia longiflora,	white,	June,	
Brownea coccinea,	scarlet,	July,	splendid.
..... grandiceps,	scarlet,	July,	very splendid.
..... latifolia,	scarlet,	June,	fine species.
Brugmansia candida,	white,	Aug.	showy.
..... suaveolens,	white,	Aug.	large flowers.
..... sanguinea,	red,	Aug.	good kind.
Butea frondosa,	scarlet,	May,	splendid species.
..... superba,	scarlet,	May,	splendid species.
Carolinea insignis,	red,	July,	All the species of Carolinea are very handsome, and are easy of culture.
..... princeps,	red.	July,	
..... minor,	red,	June,	
..... alba,	white,	May,	
Canella alba,	white,	April,	very free flowerer.
Clerodendron speciosissima,	red,	June,	finest species.
Crossandra undulæfolia,	orange,	Feb.	splendid.
Careya arborea,	red,	June,	rather scarce plants, rarely to be seen in collections.
..... sphærica,	red,	July,	
Dracæna ferrea,	white,	March,	palm-like.
Eranthemum pulchellum,	blue,	June,	free flowerer.
Erythrina horrida,	scarlet,	May,	All the species of Erythrina are very splendid when in flower.
..... macrophylla,	scarlet,	Aug.	
..... enneandra,	scarlet,	June,	
..... poianthes,	scarlet,	Feb.	
..... fulgens,	scarlet,	June,	
..... velutina,	scarlet,	July,	
Euphorbia splendens,	scarlet,	Feb.	showy.

Plate .5.

1 2 3

Oniscus asellus

S. H. Del —

p. 31. 62,

Cypripedium insigne!

Maybrick . . Livd.

Euphorbia jacquiniflora,	scarlet,	March,	beautiful.
Gardinia radicans,	white,	June,	very fragrant.
Geissomeria longiflora,	scarlet,	July&Aug.	splendid.
Guettarda speciosa,	scarlet,	June,	handsome.
Gustavia augusta,	white,	July,	splendid.
Hibiscus splendens,	rose,	May,	beautiful.
..... mutabilis,	white,	Sept.	beautiful.
..... Lindlei,	purple,	July,	beautiful.
Ixora coccinea,	scarlet,	June,	beautiful.
..... crocata,	orange red,	June,	beautiful.
..... Bandhuca,	scarlet,	July,	beautiful.
..... alba,	white,	June,	beautiful.
Jacaranda mimosæfolia,	blue,	April,	elegant.
Jacquinia arborea,	white,	July,	beautiful.
Justicia venusta,	purple,	Sept.	pretty.
..... speciosa,	purple,	Sept.	pretty.
..... carnea,	rose,	July,	showy.
Laurus splendens,	yellow,	July,	neat grower.
Magnolia odoratissima,	yellow,	July,	very fragrant.
Melastoma sanguinea,	purple,	July,	pretty.
..... corymbosa,	purple,	June,	pretty.
Mimosa polydactyla,	purple,	June,	elegant.
..... obtusifolia,	purple,	May,	elegant.
Pleroma heteromalla,	purple,	May,	pretty.
Plumbago rosea,	rose,	May,	pretty.
Poincietta pulcherrima,	scarlet,	Oct.	beautiful.
Poinciana regia,	orange red,	June,	beautiful.
..... pulcherrima,	orange red,	June,	beautiful.
Roellia ciliata,	blue,	May,	pretty.
..... venusta,	blue,	June,	pretty.
Ruellia elegans,	blue,	June,	pretty.
Rondeletia speciosa,	scarlet,	June,	beautiful.
Russelia juncea,	scarlet,	April,	beautiful.
Randia Bowieana,	white,	July,	pretty.
Sinningia guttata,	white & red,	May,	pretty.
Solandra guttata,	white,	July,	showy flowers.
..... grandiflora,	white,	July,	showy flowers.
Vinca rosea and alba,	rose&white,	May,	pretty.
Wrightia coccinea,	scarlet,	June,	splendid.

SELECTION OF SUCCULENTS

REQUIRING LITTLE WATER AT THE ROOTS, AND LESS HUMIDITY THAN OTHER STOVE SHRUBS.

Cactus Melocactus,
..... Edisii,
Caralluma fimbriata,
..... crenulata,
Cereus grandiflora,
..... Mallisonii,
..... Colvillii,
..... speciosissima,
..... Jenkinsonii,
..... nobilis,
..... flagelliformis,
..... lateritius
Epiphyllum Hookeri,
..... truncatum,
..... alatum,
..... splendidum,
..... speciosum,
..... Ackermanii,
Mammillaria speciosa,
..... pulchra,
..... canescens,
Pereskia aculeata,
..... Bleo.

SELECTION OF STOVE CLIMBERS.

Allamanda cathartica,	yellow,	June,	fine flowering species
Amphodus ovatus,	purple,	April,	rather tender.
Aristolochia trilobata,	purple,	June,	Both species re-
..... fœtens,	yel.&brown	July,	quire strong heat.
Argyreia cuneata,	purple,	March,	a free flowerer.
Bauhinia racemosa,	white,	June,	suitable for pillars.
..... scandens,	white,	June,	suitable for pillars.
Bignonia gracilis,	yellow,	April,	Rather hardy. All
..... venusta,	orange,	Sept.	the species of
..... paniculata,	purple,	April,	Bignonia re-
..... æquinoctialis,	yellow,	April,	quire a deal of
.... Chamberlaynii,	yellow,	April,	room to grow.
Columnea hirsuta,	scarlet,	Aug.	require little wa-
..... scandens,	scarlet,	Aug.	ter in winter.
Cylista scarrosa,	yellow,	April,	suited for pillars.

Combretum purpureum,	scarlet,	June,	Very splendid. All the Combretums are of rather slow growth, and somewhat tender.
..... paniculatum,	scarlet,	Jan.	
..... grandiflorum,	scarlet,	Feb.	
..... Afzelia,	scarlet,	Feb.	
..... comosum,	purple,	May,	
..... elegans,	scarlet,	April,	
Echites stellaris,	rose cold.	Aug.	handsome, slow grower
Hoya carnosa,	white,	June,	honey flower.
..... Pottsii,	white,	June,	scarcely so good as carnosa.
Ipomæa Horsfalliæ,	rose cold.	Oct.	spendid species.
..... alba-cærulea,	white,	June,	fine large flower.
..... speciosa,	purple,	July,	free flowerer.
Jasminum Sambac,	white,	Jan.	fragrant and delicate.
Jonesia scandens,	scarlet,	June,	splendid plant.
Manettia glabra,	scarlet,	Oct.	a very free flowerer.
Morenoa globosa,	scarlet,	May,	very handsome.
Olax scandens,	white,	Jan.	pretty species.
Passiflora kermesina,	crimson,	June,	a very beautiful species
..... Loudonii,	scarlet,	June,	beautiful species.
..... princeps,	scarlet,	June,	very free flowerer.
..... Buonapartea,	purple&red	April,	handsome species.
..... phœnicea,	red,	May,	free flowering species.
..... alata,	red &white,	May,	good fruit bearer.
..... quadrangularis,	red &purple	May,	fruit bearer.
..... edulis,	white,	May,	good fruit bearer.
..... Andersonii,	striped,	June,	handsome species.
..... Canavellesii,	orange,	July,	handsome species.
..... longiflora,	white,	May,	slow grower.
..... Murucuja,	scarlet,	June.	good fruit bearer.
Pergularia odoratissima,	green,	June,	very fragrant.
Thunbergia alata,	yellow,	all year,	All the species of Thunbergia are beautiful, very free flowerers and suited for either trellis or rafters.
..... alba,	white,	all year,	
..... Hawteyana,	scarlet,	May,	
..... coccinea,	scarlet,	May,	
..... grandiflora,	blue,	June,	
..... purpurea,	purple,	May,	
..... fragrans.	white,	May,	

Phisianthus albens,	white,	Aug.	rather scarce.
Quisqualis indica,	rose,	May,	resembles combretum.
Stigmaphyllon aristata,	yellow,	June,	beautiful plant.
Thryallis brachystachys,	yellow,	Oct.	suited for a rafter.

SELECTION OF STOVE PERENNIALS.

Amaryllis Forbesii,	rose&white,	July,	hardy stove species.
....purpurea,	purple,	July,	hardy stove variety.
..... reticulata,	purple,	May,	Brazilian species.
..... Johnsoni,	striped,	May,	hardy stove species.
..... versicolor,	various clrs.	all year,	a hybrid.
..... costata,	striped,	all year,	a handsome hybrid.
..... variegata,	striped,	June,	a handsome hybrid.
..... equestris,	scarlet,	July,	a West Indian species.
..... regina,	scarlet,	May,	an American species.
..... Kermesina,	scarlet,	June,	a new kind.
..... Colvillii,	red&purple	June,	a hybrid.
..... vittata,	various clrs.	July,	rather tender kind.
..... fulgida,	orange scrl.	April,	a Brazilian species.
..... crocata,	orange scrl.	April,	a handsome Brazilian species.
..... expasa,	dark red,	all year,	a handsome hybrid.
Alströmeria pulchella,	scarlet,	June,	a beautiful species.
....pilosa,	orange sclt.	June,	a variety of the above.
..... Ligtu,	scarlet,	Feb.	a handsome Peruvian species.
..... Flos Martini,	various clrs.	June,	beautiful.
Aphanochilus blandus,	green,	July,	fragrant.
Asclepias curassavica,	scarlet,	June,	handsome.
Barbacenia purpurea,	purple,	July,	a Brazilian species.
Brachystelma crispa,	brown&yel.	Aug.	a new species.
Canna iridiflora,	scarlet,	Jan.	splendid flower.
Crinum Amabile,	pale rose-clrd.	June,	splendid.
..... augustum,	white&rose,	June,	beautiful.
..... cruentum,	red,	June,	very showy.

Crinum insigne,	rose-colrd.	Oct.	beautiful.
Calathea zebrina,	red&yellow	Feb.	the leaves striped with red
Chlidanthus fragrans,	yellow,	May,	will flower in the greenhouse.
Dichorizandra thyrsiflora,	blue,	Aug.	require strong heat.
..... picta,	blue,	Sept.	new species.
Doryanthes excelsa,	buff,	July,	requires little heat.
Erythrina laurifolia,	scarlet,	July,	usually called Crista-galli.
..... herbacea,	scarlet,	June,	rather hardy.
..... resupinata,	scarlet,	May,	scarce species.
Gastrochilus pulcherrimus,	yell.&pink	Aug.	beautiful.
Gesneria bulbosa,	scarlet,	June,	All the species of Gesneria are very handsome, and deserve extensive culture; they require strong heat and much moisture to flower to perfection.
..... Suttoni,	scarlet,	June,	
..... Douglasii,	buff & red,	June,	
.... Cooperii,	scarlet,	May,	
..... splendens,	scarlet,	June,	
..... rutila,	scarlet,	June,	
....atrosanguinea,	scarlet,	July,	
..... macrostachya,	scarlet,	July,	
Gloriosa superba,	yellow,	July,	handsome; grows tall.
Gloxinia caulescens,	purple,	June,	All the species of Gloxinia grow the finest in pure leaf mould, and should have plenty of heat.
..... maculata,	purple,	June,	
..... speciosa,	purple,	June,	
..... candida,	white,	June,	
Griffinia hyacinthina,	blue,	May,	very handsome, free flowerer.
Hibiscus crinitus,	yellow,	Aug.	splendid flower.
Hæmanthus multiflora	red,	May,	handsome.
Hedychium coronarium,	yellow,	June,	Both these species of Hedychium are fragrant
..... coccineum,	orange red.	July,	
Heliconia humilis,	scarlet,	Aug.	handsome species.
..... braziliensis,	scarlet,	Aug.	requires strong heat.
Littæa gemminiflora,	green&white,	June,	hardy stove species.
Marica cærulea,	blue,	May,	rather hardy.
..... Sabini,	blue,	Aug.	somewhat tender.
Musa coccinea,	scarlet,	June,	splendid.
Pancratium pedale,	white,	Aug.	long bell shaped flower.
..... plicata,	white,	July,	rather new species.

Pancratium amænum,	white,	May,	handsome species.
..... Zeylanica,	white,	June,	keep at warm end of house
Pitcairnia staminea,	scarlet,	Feb.	grows like a pine-apple.
Phycella ignea,	crimson,	Oct.	handsome, related to
..... cyrtanthoides,	crimson,	June,	Amaryllis.
Portculaca Gilliesii,	purple&red	June,	a new species.
Polianthes tuberosa,	white,	Aug.	extremely fragrant.
Strelitzia regina,	yel. &prple.	May,	All the Strelitzias flower freely in the greenhouse, and are very handsome.
..... juncea,	yel. &prple.	June,	
..... augusta,	white&pur.	March,	
..... ovata,	yel. &prple.	Feb.	
Streptocarpus Rexii.	blue,	March,	very pretty.

SELECTION OF STOVE BIENNIALS.

Aneilema nudiflora,	blue,	pretty, is middling hardy.
Barleria longifolia,	white,	rather hardy.
Capsicum frutescens,	white,	small Chili capsicum.
Gossypium indicum,	yellow,	liable to be infested with Aphis.
Gynandropsis speciosus,	white,	handsome, rather scarce.
Gomphrena amaranthoides,	white,	not very showy, but both
..... decumbens,	purple,	species deserve culture.
Hibiscus tubulosus,	yellow,	requires good heat.
Indigofera trista,	rose,	handsome; free flowerer.
Ipomæa multiflora,	rose,	Both species of Ipomæa are
..... sphærocephala,	purple,	extensive climbers.
Mimosa sensitiva,	rose,	true sensitive plant, scarce.
..... pudica,	purple,	usually termed *sensitive plant.*
Sesbania picta,	yellow,	rather hardy.
Stachytarpheta jamaicensis,	blue,	Very free flowerers, require a
..... prismaticus,	blue,	good heat.
Tephrosia piscatoria,	purple,	pretty, a free flowerer.
Torenia scabra.	purple,	very pretty, requires good heat.

SELECTION OF STOVE ANNUALS.

Browallia elata, purple,
..... alba, white,
..... grandiflora, blue,
Cleome rosea, rose,
Commelina cuculata, blue,
Centroclinium reflexum, rose,
Cassia obovata, yellow,
Celosia cristata, red,
..... varieties,
Capsicum Annuum, white,
Celsia coromandeliana, yellow,
Gomphrena globosa, purple,
..... alba, white,
..... striata, varieg.
Gynandropsis pentaphylla, white,
Gossypium herbaceum, yellow,
Hibiscus digitatus, red & white,
Indigofera endecaphylla, scarlet,
Ipomæa violacea, purple,
..... repanda, scarlet,
..... Nil, blue,
..... Quamoclit, red,
Lobelia hypocrateriformis, prple.
Lablab leucocarpus, white,
Leucas chinensis, white,
Martynia lutea, yellow,
Manulea argentea, yellow,
Plumbago rhombifolia, blue,
Pycnostachys cœrulea, blue,
Stachytarpheta indica, white,
Salvia foliosa, blue.
Rhexia hypericoides, red.

The kinds of Capsicums, Cockscombs, and Balsoms are so various, that any enumeration of them, in a list like the above, would scarcely be practicable. Seedsmen generally mix the varieties together, and sell them in this way to purchasers.

SELECTION OF STOVE AQUATICS.

1.—True Aquatics, or such as require the roots to be totally immersed in water :—

Euryale ferox,	red,	July.
Heteranthera reniformis,	blue,	July.
Limnocharis Humboldtii,	yellow,	June.
..... Plumierii,	yellow,	June.
Nelumbium caspicum,	rose,	June.

Nelumbium jamaicensis,	blue,	June.
..... speciosum,	rose,	June.
Nymphæa ampla,	white,	June.
..... blanda,	white,	June.
..... cœrulea,	blue,	June.
..... cyanea,	blue,	June.
..... edulis,	white,	June.
..... lutea,	yellow,	June.
..... pubescens,	rose,	June.
..... rubra,	red,	July.
..... stellata,	blue,	June.
Papyrus antiquorum,	apetalous,	July.
..... elegans,	apetalous,	July.
Pontederia azurea,	blue,	July.
..... crassipes,	blue,	September.
..... dilatata,	blue,	May.
..... lanceolata,	blue,	August.
Vallisneria spiralis,	brown,	July.
Villarsia indica,	white,	June.
..... ovata,	orange,	May.

2.—Such as do not require their roots to be immersed in water. These should be plunged in a bed of moss, which must be constantly kept well saturated with water during the growing season:—

Cephalotus follicularis,	white,	June.
Dionæa muscipula,	white,	July.
Drosera binata,	white,	June.
..... pauciflora,	white,	July.
Nepenthes distillatoria,	green,	April.

SELECTION OF STOVE FERNS.

Acrostichum aureum,	Asplenium nidus,
Aneimia adiantifolia,	..... fragrans,
..... hirsuta,	Aspidium molle,

Aspidium macrophylla,
Adiantum pulverulentum,
..... tenerum,
..... trapeziforme,
Cheilanthus ferruginea,
Diplazium esculentum,
Gymnogramma sulphurea,
..... tartarea,
..... calomolamus,
Hemionitis palmata,
Ligodium scandens,
Ligodium circinatum,
..... palmatum,
Meniscium reticulatum,
Ophioglossum petiolatum,
..... reticulatum,
Polypodium fraxinifolium,
..... pruinatum,
Pteris palmata,
..... caudata,
Vittaria lineata.

SELECTION OF BEAUTIFUL STOVE ORCHIDEÆ.

1.—Epiphytal, or such as grow upon other plants in their native Countries:—

Arides odorata, pale rose, June, very durable; fragrant.
Æranthes sesquipedalis, white, June, large and splendid; scentless.
..... grandiflora, yellow, June, from Madagascar; scentless.
Anguloa superba, red and purple, July, not tender; fragrant.
..... grandiflora.
Batemannia Colleyi, orange red, July, handsome; new Genus.
Brassia caudata, yellow-green, June, from West Indies; elegant.
..... Lanceana, yellow, March, elegant species; fragrant.
..... maculata, yellow-green, June, from Jamaica; elegant.
Brassavola nodosa, white, September, West Indies; fragrant.
..... cuculata, white, June, West Indies; fragrant.
Cælogyne nitida, white and yellow, June, Nepal; fragrant.
..... punctulata, white and yellow, June, Sylhet; scentless.
..... flaccida, white and yellow, June from Nepal; scentless.
Catasetum tridentatum, yel. & brown, July, from Trinidad; scentless.
..... luridum, green, March, free grower; scentless.
Cattleya guttata, green & brown, July, a beautiful kind; scentless.
..... intermedia, rose & purple, April, a fine species; scentless.
..... crispa, white, August, very splendid; scentless.

Cattleya Loddigesii, rose-colour, June, almost equal to crispa; [scentless.

..... labiata, rose-colour, very splendid; scentless.

Ceratochilus insignis, white & red, Oct. very splendid; very fragrant

..... grandiflorus, white, May, a beautiful species; very [fragrant.

Cirrhæa Warreana, yellow and red, July, very beautiful; scentless.

..... Loddigesii, yellow and red, July, singularly handsome; [slightly fragrant.

..... viridipurpurea, green, yellow, and red, July, similar to the [last; scentless.

Coryanthes maculata, yellow and purple, May, a splendid species; [fragrant.

..... speciosa, yellow, June, flowers large; fragrant.

Cycnoches Loddigesii, brown and green, June, very singular; [very fragrant.

Dendrobium speciosum, pale yellow, April, a very common species; [scentless.

..... pulchellum, white and rose, February, very hand- [some; scentless.

..... moschatum, orange, April, a splendid species; scent- [less.

..... cærulescens, blue, March, very beautiful; nearly new.

..... Pierardia, rose-colour, February, beautiful, scentless.

..... chrysanthum, deep yellow, April, an elegant species; [scentless.

..... calceolaria, orange, April, similar to moschatum; [scentless.

..... fimbriatum, yellow, April, beautiful; scentless.

Epidendron cuspidatum, pale yellow, May, pretty; scentless.

..... nocturnum, greenish yellow, October, not very hand- [some; fragrant at night.

..... bicornutum, white, May, handsome; very fragrant.

..... Harrisoniæ, green, Oct. a beautiful species; scentless.

..... oncidioides, yellow & brown, June, like an Oncidium; [very fragrant.

Gongora atropurpurea, dark purple, May, singular flower; scentless.

Grobya Amhersti, brown, green, Sept. very curious; scentless.

Lælia anceps, white, November, curious ; scentless.
..... autumnalis, white and rose, September, handsome ; scentless.
Leptotes bicolor, rose and white, April, a delicate species; scentless.
Maxillaria tetragona, green and white, June, deserving culture; very fragrant.
..... Harrisoniæ, white and purple, April, free growing species; very fragrant.
..... racemosa, yellow, May, rather new ; slight fragrance.
.... picta, yellow red, Nov. flowers solitary ; very elegant.
..... aromatica, yellow, May, a fine species ; very fragrant.
..... Deppei, white and yellow, June, handsome ; scentless.
Monacanthus viridis, green, September, singular ; scentless.
..... discolor, green and brown, September, singular ; scentless.
Myanthus barbatus, white and brown, April, rather new species ; scentless.
..... cernuus, green and brown, April, handsome ; scentless.
Oncidium flexuosum, yellow, June, beautiful ; scentless.
..... crispum, Copper-coloured, May, a fine species ; scentless.
..... papilio, yellow & brown, May, singular flowers ; scentless.
..... pulchellum, white & yellow, July, beautiful ; scentless.
..... luridum, green & brown, Feb. singular colour ; scentless.
..... altissimum, yellow, August, flower stem tall ; scentless.
..... ampliatum, yellow, February, very elegant ; scentless.
..... variegatum, yellow and brown, June, not very showy ; scentless.
..... marginatum, yellow, June, somewhat new ; scentless.
..... carthaginensis, green, April, flower stem tall ; scentless.
..... divaricatum, yellow, May, very splendid ; scentless.
Renanthera coccinea, scarlet, March, very splendid ; a climber.
Rodriguezia secunda, rose-colour, Oct. elegant species ; scentless.
..... planifolia, yellow, May, handsome kind ; scentless.
Sarcanthus rostratus, orange & red, October, requires heavy shade ; scentless
..... teretifolius, yellow and red, October, will grow well on wood ; scentless.
..... paniculatus, yellow and brown, June, flower stem tall ; scentless.

Saccolabium guttatum, white and red, April, requires strong heat; [scentless.
..... rubrum, rose coloured, June, new species; scentless.
..... papillosum, orange and red, September, flowers small; [scentless.
Stanhopea eburnea, white, August, beautiful; fragrant.
..... oculata, pale yellow, June, fine species; fragrant.
Vanda Roxburghii, yellow, November, fine species; scentless.
..... multiflora, yellow, May, pretty species; scentless.
Zygopetalon Mackai, green & red, July, flowers durable; scentless.
..... rostratum, green and brown, October, flowers large; [scentless.
..... stenochilon, green and red, October, flowers small; [scentless.
..... maxillare, green and brown, August, lip purple; [scentless.
..... crinitum, green and red, September, resembles Mackai; [scentless.

Other names, by which many of the above Plants have been described or figured in Botanical Works:—

Æranthes arachnitis of Bot. Reg. is Æranthes grandiflora.
Ærides paniculatum of Bot. Reg. is Sarcanthus paniculatus.
..... guttatum of Roxb. is Saccolabium guttatum.
..... retusum of Willd. is saccolabium guttatum.
..... undulatum of Smyth is saccolabium pappillosum.
..... cornutum of Bot. Reg. is Ærides odorata.
Anguloa grandiflora of spreng. is ceratochilus insignis.
..... luridum of Link. is Catasetum luridum.
Aulizia ciliaris of Salisb. is Epidendrum ciliare.
Catasetum Claveringi, of Bot. Cab. is Catasetum triendatum.
..... floribundum of Hooker is Catasetum tridendatum.
..... trifidum of Hooker is Myanthus cernuus.
Ceratochilus oculatus of Bot. Cab. is Stanhopea oculata.
Cœlogyne occellata of Lindl. is Cœlogyne punctulata.
Cymbidium cuculatum of Swartz. is Brassavola cuculata.
..... nitidum of Rox. is Cœlogyne nitida.

Cymbidinm dependens of Bot. Cab. is Cirrhæa Lodigesii.
..... guttatum of Willd. is Oncidium luridum.
..... variegatum of Swartz. Oncidium variegatum.
..... nodosum of Swartz. is Brassavola nodosa.
..... prœmorsum of Swartz. is Saccolabium pappillosum.
Colax Harrisoniæ of Lindl. is Maxillaria Harrisoniæ.
Dendrobium calceolus Lindl. is Dendrobium moschatum.
..... cuculatum of Bot. Reg. is Dendrobium Pierardi.
..... Harrisoniæ of Hooker is Maxillaria Harrisoniæ.
..... arachnitis of Thouars is Æranthes grandiflora.
Epidendrum grandiflorum of Humb. is Ceratochilus insignis
..... caudatum of Lin. is Brassia caudata.
..... cucullatum of Linn. Brassavola cuculata.
..... nodosum Linn. is Brassavola nodosa.
..... violaceum Lodd. is Cattleya Lodigesii.
..... ciliare of Bot. Mag. is Epidendrum cuspidatum.
..... altissimum Jacq. is Oncidium altissimum.
..... undulatum of Bot. Mag. is Oncidium Carthaginense.
..... Carthaginense Jacq. is Oncidium Carthaginense.
..... guttatum Lin. is Oncidium luridum.
..... variegatum Swartz. is Oncidium variegatum.
..... retusum Linn. is Saccolabium guttatum.
..... moschatum is Dendrobium moschatum.
Eulophia Mackaiana of Bot. Reg. is Zygopetalon Mackai.
Gongora viridipurpurea of Hooker is Cirrhæa viridipurpurea.
..... speciosa of Bot. Mag. is Coryanthes speciosa.
Gomeza recurva of Bot. Mag. is Rodriguezia recurva.
Limodorum retusum is Saccolabium guttatum.
Malaxis caudata of Willd. is Brassia caudata.
Oncidium cuneatum of Lindl. is Oncidium luridum.
Rodriguezia lanceolata of Bot. Cab. is Rodriguezia secunda.
Sarcanthus guttatus of Bot. Reg. is Saccolabium guttatum.
Saccolabium ampullaceum Lindl. is Saccolabium rubrum.
Stanhopea insignis is Ceratochilus insigne.
..... grandiflora is Ceratochilus grandiflora.
Thalia maravara is Saccolabium pappilosum.
Vanda paniculata is Sarcanthus paniculatus.
..... teretifolia is Sarcanthus teretifolius.

SELECTION OF TERRESTRIAL ORCHIDEÆ,

REQUIRING THE HEAT OF THE STOVE.

Acanthophippium bicolor,	orange & purple,	June,	scentless.
Bletia hyacinthina,	prpl. rose-colrd.	March,	scentless.
..... Shepherdii,	purple,	Jan.	scentless.
..... Tankervilliæ,	brown & white,	Nov.	scentless.
Bonatea speciosa,	green,	July,	fragrant.
Calanthe veratrifolia,	white,	May,	scentless.
Cymbidium aloifolium,	purple,	June,	handsome.
..... sinensis,	purple & yellow,	June,	fragrant.
..... lancifolium,	white & yellow,	June,	slight fragrance.
Cypripedium insigne,	yellow & brown,	Oct.	scentless.
..... venustum,	green & red,	July,	scentless.
Eulophia guineensis,	green & brown,	June,	fine species.
Geodorum dilatatum,	rose-colour,	May,	fine species.
Govenia superba,	yellow,	March,	very fragrant.
Habenaria gigantea,	white,	Sept.	very fragrant.
Lissochilus speciosus,	yellow,	May,	splendid.
Neottia grandiflora,	green,	March,	a good kind.
Peristeria elata,	white,	May,	fine fragrance.
Phajus maculatus,	yellow green,	June,	fine species.
Stenorhynchus speciosus,	scarlet,	March,	beautiful.

Names by which many of the above are called :—

Ærides Borassi is Cymbidium aloifolium.
Bletia Woodfordii of Bot. Mag. is Phajus maculatus.
..... flava of Wallich is Phajus maculatus.
Cymbidium hyacinthina Smith is Bletia hyacinthina.
..... striatum of Swartz. is Bletia hyacinthina.
..... fragrans of Salisb. is Cymbidium sinensis.
Cistella cernua of Blum. is Geodorum dilatatum.
Epidendrum striatum is Bletia hyacinthina.
..... aloifolium Linn. is Cymbidium aloifolium.
..... sinensis Bot. Mag. is Cymbidium sinensis.

Gyas humilis of Swartz. is Bletia hyacinthina.
Limodorum striatum Thumb. is Bletia hyacinthina.
..... tuberosum is Bletia Shepherdii.
.... Tankervilliæ Willd. is Bletia Tankervilliæ.
..... Incarvillei Pers. is Bletia Tankervilliæ.
..... veratrifolia Willd. is Calanthe Veratrifolia.
..... recurvum Willd. is Geodorum dilatatum.
Malaxis cernua Willd. is Geodorum dilatatum.
Neottia speciosa Jacq. is Stenorhynchus speciosus.
Orchis triplicata Willd. is Calanthe veratrifolium.
Pachyne spectabilis Salis. is Bletia Tankervilliæ.
Phajus grandifolius is Bletia Tankervilliæ.

GENERAL MANAGEMENT OF STOVE PLANTS.

All Stove Plants are natives of countries within or near the tropics, and are consequently subjected in their wild state to a high temperature, but the situations in which they are found being various, the treatment of genera varies in proportion; some requiring full exposure to the sun,—others much shade; some great humidity, almost approaching to saturation,—others considerable drought; and others again a middle treatment, betwixt these extremes.—But all, whatever may be their other peculiarities, agree in this particular,—that a state of partial torpidity, or rest, with a lower temperature than usual, and less excitement from water and other causes, is indispensable for their successful culture.

Stove Plants may be divided into two general divisions; 1st. such as require great humidity during their season of growth, called "Moist Stove Plants;" and, 2nd, those requiring little humidity at any season, called "Dry Stove Plants." In large establishments, where the collections of plants are extensive, it is best to grow these two kinds in separate houses; but where the collections are small, one house will answer both purposes, provided plants of similar habits are placed together.

It is difficult to draw a line by which these two divisions of Stove Plants can be readily distinguished. But as a general rule,—

all species of slow growth, and delicate structure, together with such as are disposed to succulency, are "DRY STOVE PLANTS;" whilst on the other hand, all robust and free growing species are "MOIST STOVE PLANTS." There are, however, exceptions. The construction of the house appropriated to the growth of common Stove Plants, need not differ from a common Pine Stove, unless it is wished to grow the taller kinds, then a lofty house is indispensable.

The three essential points to be considered in the formation of a Plant Stove, are—1st, to secure sufficient light; 2nd, heat; 3rd, humidity. The first is obtained by building the house with a south aspect, and by making the wood-work light; the second, by the proper construction of the flues, or other means, by which heat may be supplied; and the third, by having the flue covers dished, so that the water poured on will not immediately run off; all which will be explained at large in the proper place.

In the culture of Stove Plants two things must be kept in mind. 1st. That all, without exception, require a season of excitement and growth, and, 2nd, a season of partial torpidity and rest. The most natural time for excitement and growth, is, when the greatest outward helps are afforded, which is from March until October; and on the contrary, when the rays of the sun become feeble, and the days short and gloomy, as from October to March, *nature* points out this to be the most proper season for torpidity and rest.

MOIST STOVE PLANTS.

GROWING SEASON CONTINUING FROM MARCH TO OCTOBER.

Temperature.—During the growing season, the temperature ought never to fall below 60 degrees Fahr. nor rise higher than 85 degrees, unless at the time of syringing, when 90 or 95 degrees may be allowed without injury, provided the direct rays of the sun do not fall upon the plants.

During the months of June, July, and August, this heat can be sustained without fires, but during the rest of the year fires are more or less necessary.

Plate 1

Euphorbia jacquiniflora
Jasminum Sambac

S. H. Del.

1 White Scale or Pine Bug
2 Male
3
4 Crimson Scale or Mealybug
5 Aphis Cassie. p58.

Air.—In fine mornings, when the glass has risen above 70 degrees Fahr. air may be admitted; the obnoxious vapours collected during the night are thus allowed to escape early, and the air of the house is rendered sweet and wholesome, which is of immense advantage to the plants.

The best way of admitting air is either by drawing down the back lights, or opening ventillators in the back wall, but avoid as much as possible any direct draught of air through the house, for plants exposed to this are invariably injured; 1st, the roots receive a severe check, and are unable to supply nourishment to the plants, from the soil in the pots becoming too dry; and 2nd, the evaporation from the leaves being too great for the supply furnished by the roots, the tender extremities of the circulating vessels become withered, and the due secretions are therefore obstructed.

Always shut up the house early in the afternoon, even in hot weather; this will allow of a good command of heat in the evening. On all cool days only allow the air to remain a sufficient time for the escape of obnoxious vapours, which may not require more than a hour at most, sometimes not half that time.

Watering.—During March, April, and May, continue to increase the supply of water at the roots. In June, July, and August let them have abundance; but from the end of August begin to decrease the quantity: this decrease of quantity will prepare the plants for their winter repose, during which time very little water is required, and that little only when the soil in the pots becomes visibly dry.

From the end of August to the end of April the best time of the day to water the plants is early in the morning; but from the beginning of May until the end of August, the most proper time is the afternoon.

Syringing.—During the months of June, July, August, and the beginning of September, if the weather is hot and dry, syringe the plants overhead with clear water three times a week, but in the spring months twice a week is sufficient, and during September only once a week; this keeps the plants clean, and greatly promotes their health.

The proper time for syringing during Spring and Autumn is early in the day, that the moisture may have time to dry up; for if otherwise, the nights being sometimes damp and cold, the lives

of some of the more delicate species are endangered, from the chilliness occasioned by a superfluity of moisture. But the best time for syringing, during the hot months of summer, is in the afternoon: first water the plants, then close up the house, and syringe, the heat may then be allowed to rise as high as 90 degrees Fahr. The reason of the afternoon being preferable to the morning at this season of the year, is—that the influence of the sun being great, there is danger, if the plants were wet in the mornings, that the leaves and stems of the more tender kinds might be scalded, because the direct rays of the sun would be upon them too early, before they could be sufficiently dried; also the plants are greatly benefitted by the house being kept closed for some hours after the operation, which could not be safely done early in a hot summer's day; for although the roof might be shaded to prevent injury from the sun, yet the morning air would then be totally excluded from the plants, than which a greater loss could not be experienced.

The advantages of syringing in an afternoon, during the summer months, are fourfold: 1st, the plants have all the benefit of the morning air; 2nd. there is no danger of the stems or leaves scalding from the powerful influence of the sun; 3rd, the house can be kept closed without any damage for many hours; and 4th, the great moisture in the house during a hot summer's night, recruits the exhausted powers of the plants, and resembles, in some degree, the heavy dews of tropical countries.

Steaming.—To prevent the air of the house becoming too dry for the health of the plants during the growing season, throw water upon the flues every afternoon when the weather is fine.

Soil.—The soil most suitable for the general purposes of Stove Plants, is composed of the following proportions:—

4 barrowsfull of rich light loam, the top spit from an old pasture.
1 barrowfull of leaf mould, very rotten.
1 barrowfull of heath mould, (often called peat.)
½ barrowfull of very rotten dung, from a hotbed.

If these ingredients are thrown together a few months before they are used, so much the better.

Sifting the Soil.—Although it is necessary to sift the soil for sowing fine seeds, and some other purposes, yet for general use, if it can be broken fine enough, it is better not to sift, because

much of the fibrous parts being removed from the soil, it is liable to bake hard in the pots, and consequently unfit for the free growth of tender roots.

Potting.—The most common times for potting are from the beginning to the end of March, and from the beginning to the end of September. But as a general rule, never allow the roots of any plant to become matted, but as soon as they begin to appear through the hole at the bottom, immediately repot, and the plants by this means will never meet with a serious check.

Drainage.—Never omit to lay at the bottom of each pot plenty of broken crocks, that there may be a free circulation of water through them. Stagnation is always injurious, for these two reasons;—1st, the plants become over-gorged with excessive moisture, and 2nd, they are obliged again to receive into their system their excrementitious rejections.

Pots.—Never use hard-baked pots, it is invariably found that plants never thrive, in them; and as a general rule, rather under-pot than over-pot a plant, for experience has proved that no plant in a pot thrives so well as when its roots can speedily get to the sides; but there are strong growing species that will grow in almost any sized pots.

Bottom heat.—As a general rule, it is preferable never to plunge moist stove plants in beds of tan, or other fermentible substances: although for many years this was much practised, it is now nearly exploded, for these three reasons;—1st, the roots of many species often perished from over moisture; 2nd, the excessive humidity necessary for free growth, rotted the materials almost immediately; and 3rd, the species that did thrive under this management grew so rapid, that the bounds allotted to them were insufficient to bring them into flower.

DRY STOVE PLANTS.

Dry stove plants are of three kinds; *first*, such as are slow of growth, and of a rather delicate habit, but in other respects are similar to moist stove plants; such are the species of Cinnamomum, Pimenta, Canella, Carolinea, Poinciana, &c. *Second*, such as are

partially disposed to succulency, as Cerbera, Columnea, Euphorbia, Plumiera, &c. And *Thirdly,* true succulents, as Cacteæ, many species of Euphorbia, Stapelia, Caralluma, &c.

Dry stove plants are generally considered such as not only require less water than moist stove plants, but also a temperature, intermediate betwixt the moist stove and greenhouse. If only Cacteæ and other succulents were grown, this would be the temperature required; but by dry stove plants, in our present divisions, we include all such as are more delicate in their habits, of slower growth, and more impatient of moisture than moist stove plants, and withal require in many, as strong, or stronger heat.

The *first* of the above general divisions of dry stove plants, being of dry shrubby habits, require similar treatment in many points with moist stove plants; there are, however, three important differences,—the 1st is, they do not require so much water at the roots,—the 2nd, they will not thrive if often syringed,—and the 3rd is, during the growing season they may with benefit be plunged half the depth of the pot in a bed of some fermentible substance.

The *second division* require equally as high a temperature as the first, but still less water at their roots, and many of them are so impatient of moisture, that their roots will almost immediately perish if plunged in a hotbed of any description.

The *third division,* consisting of succulents, thrive best when they have a lower temperature than either of the former, much less water, and are placed on exposed dry shelves.

Where the collections of plants are large, and the glass extensive, it is advisable to grow the first two divisions in a house by themselves, and the succulents in another; but where the quantity of glass is limited, and the collections of plants small, then the three kinds may be grown in one house; and if, as is often the case, but one house can be appropriated to the culture of stove plants, with a little management both moist and dry kinds can be made to prosper very well in the same house. Let the two first divisions of the dry stove kinds be placed as much together as possible at the warmest part of the house, and the succulents in as cold and exposed a situation as the house will afford; the remainder can be filled up with the moist stove species: these can be syringed as often as they require it, without exposing the others entirely to the same treatment.

The general principles laid down for the moist stove, as regards temperature, air, steaming, soil, pots, potting, and drainage, will equally apply to these plants, with these exceptions—that succulents do not require to be so often shifted as other plants, and it is advisable to pot them in plain sandy loam, with one-fourth of lime rubbish mixed through it, but without any dung.

Watering.—During the season of growth, the first division may be supplied pretty liberally at the roots with water, taking care however that the soil give indications of drought previous to application; the second division must receive it more sparingly, and the third will scarcely require it oftener than twice a week.

Syringing.—In hot dry weather this may be performed once a week, after the same manner as recommended before.

Placing out of doors.—In June, July, and August, the whole tribe of Cacteæ will be benefitted by being placed out of doors, in a situation shaded from winds, but fully exposed to the mid-day sun.

As worms are liable to effect an entrance into the pots, and injure the roots, it is best to place the plants on a prepared floor of some kind.

HYBERNATION, OR WINTERING.

Temperature.—All plants require a season of rest, and the time pointed out by nature for repose, is when there are the fewest natural helps, as in November, December, January, and February. The more complete the torpidity at this season, the more vigorous will they unfold themselves in their season of growth. The temperature need never stand higher than 60 degrees, nor lower than 50 degrees, during November and February; and from 50 to 55 degrees in December and January.

Air.—Every opportunity, when the weather will allow, give air to sweeten the house, but be careful that the cold wind does not blow upon the plants.

Watering.—Although all stove plants in their growing season enjoy humidity in a greater or less degree, yet during their torpidity

steam, or any other cause of dampness, is injurious. Give only as much water at the roots as nature requires; for a low temperature, and excessive moisture, will soon destroy all the tender and delicate kinds.

Bottom heat.—Any species plunged in bottom heat, should be taken out of it, and treated as recommended for the others; and in spring re-plunged as before.

DISEASES AND INSECTS INJURIOUS TO STOVE PLANTS.

Stove plants are liable to the attacks of many species of insects, amongst which the most destructive are the Mealy Bug, or Crimson Scale; the White Scale, or Pine Bug; the Brown Scale, or Turtle-insect; the Aphis; Chermes; Red Spider; Thrips; and Wood-louse.

The three species of Scale, the Aphis, and Red Spider, injure the plants by pumping up and subsisting on their juices; the Thrips and Chermes by destroying the cuticle of the leaves, the latter sucking the juices in addition; and the Wood-louse by voraciously devouring both the leaves, stems, and roots of almost all choice plants, particularly Orchideæ.

COCCUS VITIS.*

Crimson Scale, or Mealy Bug.—*Pl.* 4, *Fig.* 4.

Order, *Homoptera.* Division, *Coccidæ.*

This troublesome species of Coccus has often been confounded with the White Scale; and it is not uncommon for practical men to mention them as one and the same insect. A circumstance of this kind occurred to ourselves the other day. Not having a specimen of either the White or Mealy Scale in our possession, from which to make a drawing, a friend who had far more than he re-

quired, was kind enough to send in a little box, what he considered to be the White Scale, but which was no other than the Mealy Bug.

This insect is rather larger, and of a somewhat different colour from the White Scale, it is also often found in abundance in houses where a single specimen of the latter is not to be met with; it is also an universal depredator, for although, it prefers plants with hard wood and shining leaves, yet it will attack those of every description of habit; indeed there are few large collections of plants where they do not exist more or less; and where they are allowed to become numerous, they are extremely troublesome to get rid of; whereas the depredations of the White Scale seldom go beyond the various species of the tribe Bromeliaceæ, Vines, and a few hard-wooded plants; these latter only when they become so numerous as to be almost compelled to seek other than their favourite food.

The body of the Coccus Vitis, when divested of its woolly appendage, is a dull crimson, not unlike the Cochineal, but inferior in brilliancy; its body is divided into a number of segments, as shown in the figure. Each insect is covered with a short white down, resembling that of the American Blight, (Eriosoma mali,) only much shorter. They are not near so sluggish as the White Scale, but may often, when grown to a large size, be seen crawling from one situation on the plant to another, which is never the case with the latter, after they have once become half-grown.

We are not sufficiently acquainted with the natural history of this insect, to say whether it lays eggs on the plants it infests, or produces its young alive; but our own observations lead us to suspect the former. The females grow to a large size, and are remarkably prolific, so that from the appearance of one or two on a plant another week is sufficient to clothe the stem and branches as with cotton, and in a few weeks nearly every species of plant will be infested, whatever be the habit of its growth.

We have not yet been able satisfactorily to ascertain whether the males resemble those of the other species of Coccus; but in nearly every case where the Insects abound, there are small winged ones, not unlike those of the White Scale, fig. 2 *(b)*, which we suspect to be the males. The chief breeding season is in the spring, but they increase more or less at all seasons of the year, for when

the plants are kept rather dry in the torpid season of winter, they often multiply to a great extent.

To destroy the Mealy Bug.—A mixture of equal parts of strong soap suds from the wash-house, and soot water well cleared, and one fourth of good tobacco water, from the tobacco manufactory, applied with a syringe, or garden-engine, will most likely prove effectual. If any of the insects are fixed in situations where the liquid cannot reach them, it will be necessary to dislodge them with a sponge dipped in the liquid. Should the first application not be sufficient, give a second, or third, then syringe over the whole with clear, but weak lime water, and most likely both eggs and insects will be totally destroyed.

COCCUS ADONIDUM.*

White Scale, or Pine Bug.—*Plate* 4, *Figs.* 1, 2, 3.

Order, *Homoptera.* Division, *Coccidæ.*

To the whole tribe of Bromeliaceæ there is no insect more destructive than this, and when once established in a hothouse, none are more difficult to eradicate, for they will secrete themselves in the very hearts of the plants, in crevices of the walls, in cracks in the stems of plants, on the bark of vines, and in other situations where the application of remedies can scarcely reach them; but as a general depredator, it is not so destructive in a plant stove, as the Mealy Bug, which will attack indiscriminately every description of plants.

The economy of this insect resembles in many respects that of the C. hesperidum, plate 1, fig. 4, page 3; but both male and female are smaller; the latter is more prolific, and, when fixed, has less the appearance of a living creature than the C. hesperidum. The colour is a pale yellowish white, inclining in the centre to light brown, the form oval, and the whole very thin and flat; but if the sheild be carefully detached and examined with a microscope, it will be found to contain an almost incredible number of eggs, which of course are extremely small.

In the course of a fortnight these eggs are hatched, and in a

* Called by some C. hesperidum var. alba.

week afterwards the young leave the shelter of their mother's dried body, proceeding from the lower extremity, and thus leaving the shield nearly as entire to appearence as ever. The young are at this time not only remarkably small, but lively and active, as the magnified fig. 3, and with a good glass may be seen moving from one place to another, exhibiting nothing of that torpor, which, after they become visible to the naked eye, is their unvarying characteristic.

In a few days after their separation, they select a situation whereon to fix themselves for life, and there having placed themselves, pump up the juices, assume the form of fig. 1, and lay their eggs. After having performed this great business of their existence, they die as their predecessors, their skins also furnishing habitations for their numerous progeny.

The males (2) are something smaller than those of the C. hesperidum, and of a rather lighter colour; but their general habits are the same; their life is extremely short, perhaps seldom exceeding a few days.

These insects appear to increase at all seasons of the year, but particularly in the autumn and during winter, when the plants are kept rather dry; much moisture does not appear so congenial to their habits.

To destroy the White Scale.—Many recipes have been published for the destruction of these insects, all of which, under certain circumstances, are beneficial, but some are troublesome and tedious processes; others render the plants very unsightly and filthy; some, except under certain circumstances, cannot be safely applied at all.

This being the insect so injurious to the Pine Apple, and its attacks being for the most part confined to plants of that habit, of course the various recipes of eminent practical Horticulturists are applicable as far as relates to all plants of this description; or others, where they fix themselves upon hard-wooded plants. Before therefore we state our own remedies, we shall name some of those which have been recommended by various practitioners. Some of these have been tried by ourselves with good success; others we have not seen tried, but have heard them favourably spoken of.

Ideas of T. A. Knight, Esq.—This eminent man proposed

exposing the infested plants to the fumes of Ammoniacal Gas, which is found destructive to every species of insect. This might be obtained at a small expense, by pouring strong urine from the stable or cow-house upon quick lime; but a better preparation is to make a solution of muriate of soda, that is, dissolving common sal ammoniac in water, and then pouring the liquid on quiek lime. The gas, if necessary, might be blown amongst the leaves with a pair of common bellows. This we have never seen tried, but should opportunity offer, it certainly, if effectual, is a simple and easy remedy.

Destroying by Steam.—Several persons have destroyed them by filling the house for several successive days with a volume of steam, and at the same time allowing the heat to rise to 110 degrees, shading the roof to prevent injury by the sun.

Baldwin's Recipe.—This system will only answer for the species of Tillandsia, Bromelia, Billbergia, Pitcairnia, &c., most other stove plants being of two tender a habit to allow of their soil being shaken from the roots, and the plants exposed to the fumes of horse dung. The recipe is as follows:—make a bed of horse dung three feet thick, put on a frame with lights, and when the heat is up, lay some sticks on the bed, then turn out the plants from the pots, remove the soil from the roots, place the plants upside down on the faggots, put on the lights, and cover them with double mats, keep them in this heat for an hour, then take them out, dip them overhead in a tub of clean cold water, allow them to drain for an hour or two, and then re-pot them.

Nicol's Recipe.—Take one pound of soft soap, one pound of sulphur, half a pound of tobacco, one ounce of nux vomica, and four gallons of soft water; boil all these ingredients together, till reduced to three gallons. When cool, dip the plants with their roots overhead in this liquid, and place them to drain. If it is inconvenient to turn them out of the pots, mix about one-third more water in it; and water the plants overhead with it. When the insects are destroyed, syringe the plants with pure water to make them look clean.

Griffin's Recipe.—Half a pound of soft soap, one ounce of tobacco, three table-spoonsful of spirits of turpentine, and one gallon of water; stir these ingredients well together, and allow it to stand for two or three days before using, then strain it through a cloth,

and immerse the plants, or water them overhead till the insects are destroyed.

MILLAR'S RECIPE.—Clear the roots and tops well from the insects, then soak the plants 24 hours in weak tobacco water, rub off the insects that remain with a wet sponge, and place the plants in a strong heat.

M'MURTRIE'S RECIPE.—Two pounds of sulphur, two pounds of soft soap, one pound of tobacco, two ounces of nux vomica, or rat poison, and one quart of train oil. Boil these ingredients in eight gallons of soft water, and when sufficiently cool, immerse the plants.

RECIPE OF MANY GARDENERS.—Two pounds of soft soap, one pound of sulphur, one pound of tobacco, and ten gallons of soft water; boil these well together, and then add one peck of clean soot, and two ounces of spirits of camphor; stir all these ingredients together, and immerse the plants in it.

Many other recipes might be given, but the above may suffice. We have merely to state, that whenever camphor is used, great care is requisite to prevent the rays of the sun from ever striking upon the plants, otherwise every leaf will be burnt and blotched; and whenever turpentine is used, the leaves often die, do as you will; and train oil causes a very yellow and sickly appearance.

The plan we have usually followed for the destruction of this insect, is simple and easy of application, and, when properly applied, we have never seen it fail. It is as follows:—

First, take one peck of clean soot, one peck of quick lime, put them in a tub, and add twenty gallons of water; stir up the mixture well every day, and take off the scum as it rises, until the liquid is perfectly clear.

The above being ready, next get a quantity of good strong soap suds from the wash-house, and on the first hot day, water the infested plants overhead with them, in a warm state; this may be either with a syringe, garden engine, or rose watering pot. And the day following, use the clear lime and soot water in the same manner, adding to each two gallons of the clear liquor, one quart of strong tobacco water, such as is obtained at the tobacco manufactories is the best; repeat these two liquids as before, viz. the suds one day and the lime solution the next, and in a short time the insects will entirely disappear.

It is indispensible that the house or pit in which the plants should be kept close shut up, and the heat be allowed to become very strong: to prevent injury, shade from the sun with woollen nets, or other conveniency.

It is necessary that the suds and the lime solution be applied separately, as they will not mix, and if not used alternately, the effects on the insects are only partial. The first dressing generally changes the colour of the insects to a dull brown, and the process seldom requires repeating more than three times; if, however, any appear to have escaped, continue to repeat it until they are effeetually destroyed

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COCCUS HESPERIDUM.

Brown Scale, or Turtle Insect.

See Plate 1, *Fig.* 4, *c, d, e, f, and the description and other particulars, page* 3.

APHIS CASSIÆ.

Cassia Louse.—*Plate* 4, *Fig.* 3. 5

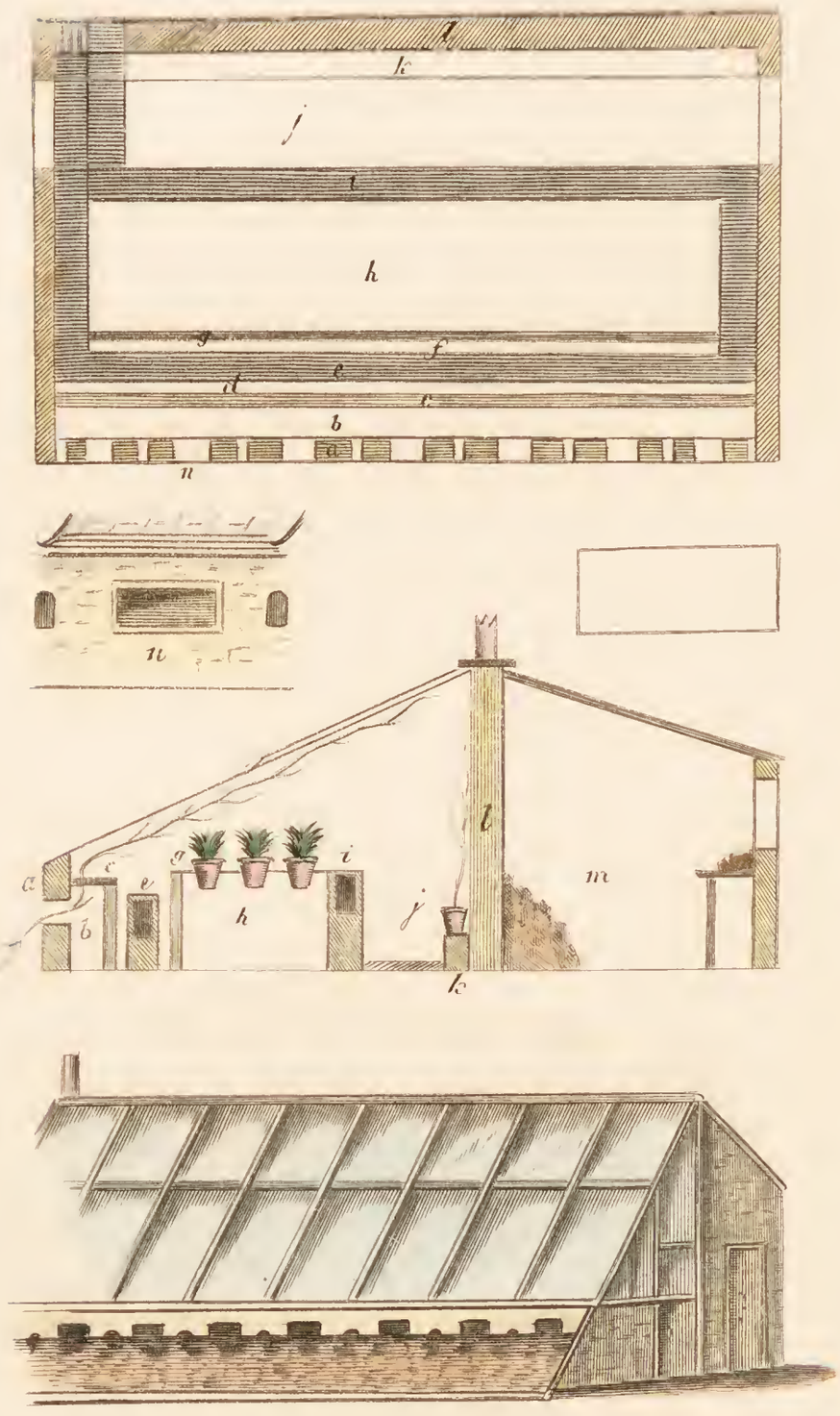
Order, *Homoptera.* Division, *Aphidæ.*

As general depredators, perhaps no insects are more injurious than Aphides, nearly every species of plant, whether exotic or native, being infested with them, either in a greater or less degree, at one time or other; and it has been thought by many well judging men, that every genus of plants has its peculiar species of Aphis. Whether this be the case or not we are unable to say.

The present subject, fig. 5, feeds upon all the tender kinds of the tribe Cassiæ and Mimosæ, chiefly selecting such as have small pinnate leaves, as those of the genus Cassia, Cæsalpinia, Mimosa, Acacia, Poinciana, Tamarindus, &c.

Whether this species of Aphis is a native of India, and was originally introduced to these countries along with tropical plants, is unknown, but it is evidently unable to bear much cold, and

Plate 5



Plan of a common Stove

thrives with the greatest rapidity in a hot dry air, and is now so general an inhabitant of our stoves, that few, either large or small collections, are without more or less of them.

The males have four long wings, but the females are wingless; the general form of both is like the A. vitis, but they are smaller. The colour is a dark olive green whilst young, but as they advance in growth the colour becomes nearly black. They increase extremely rapid, and soon cause the leaflets to become yellow and die, and the whole plant to suffer and become stunted.

Another species, *Aphis Cactæ*, is very like this, but grows somewhat larger, and when full grown is of a lighter colour. This insect is a great pest to the whole tribe of Cacteæ, particularly at the time they are coming into flower, creeping down into the very heart of the petals and sepals, and so dirtying and disfiguring the blossoms. The Pereskia aculeata is particularly subject to its attacks. Occasionally it will attack the tender leaves of many hard-wooded plants, but always prefers the Cactus tribe.

To destroy Aphis Cassiæ and Cactæ.—Fumigation with tobacco is an effectual remedy for every species of Aphis, as is also watering overhead with weak tobacco water. Also, a very cheap and simple method is to syringe the plants overhead with a mixture of equal parts of clear lime and soot water, and one-sixth of good tobacco water from the manufactory. It matters little whether this ever touches the insects or not, it is received into the constitution of the plants and thus the food of the insect is rendered poisonous; and we have invariably found that the insects immediately die.

PSYLLA CRATÆGI.

Hawthorn Chermes.

See Plate 1, *Fig.* 2, *a*, *b*, *and description, page* 2.

ACARUS TELARIUS.

COMMON RED SPIDER OR PLANT MITE.—*Plate 2, Fig. 2.*

ORDER, *Aptera.* DIVISION, *Acaridæ.*

Nearly all kinds of plants, and even the food we eat, are at one time or other infested with some species or other of mite, and so also are nearly all animals with which we are acquainted. The A. telarius, represented by the small dots on the uncoloured leaf, and the magnified figure 2, is the great pest which, for many years, mocked at the efforts of the gardeners to destroy. For although it was well known their ravages could be prevented by humidity, yet there are seasons when much humidity cannot be allowed, as when the fruit on the vines are ripening, or when it is wished partially to promote torpidity, so as to give a season of rest to the plants.

These little creatures appear equally to multiply at all seasons of the year, and their fecundity is prodigious. The females lay their eggs generally at the back of the leaves, because there they are sheltered from intense light; the eggs are very minute, of a whitish colour, and not collected in masses, but scattered thickly all over the leaves, as may be seen with a moderate microscope.

In a short time after deposition the eggs are hatched, and the young begin to move about upon the leaves. They are at first remarkably small, and colourless, but of the same form as the parents. As they advance in growth they become more and more red; when half grown they become very active, and when arrived at their full size they are dark brown, and slightly hairy.

From the time they issue from the egg until they are fully grown, they cast their skins several times, becoming each time something darker in their colour, but in other respects changing little, except in size. They construct for themselves close silken webs, by which they travel from one leaf to another: these webs also being made thick at the back of the leaves, shelter the young from the effects of moisture, which would soon prove fatal to them. Whether these little creatures spin the webs from their bodies, like spiders, or not, we have never been able to ascertain.

To destroy the Red Spider.—A moist atmosphere, and free growth of the plants, are certain preventatives to the increase of this insect; but it not being always convenient to keep the atmosphere of a stove sufficiently moist to prevent their injuries, it becomes necessary to use other means. The grand antidote is sulphur, which, if properly applied, enters into the whole system of the plants, and is without doubt very beneficial in correcting their diseases, destroying mildew, and effectually ridding them of the red spider.

Mr. Speechly appears to have been the first person who used and recommended sulphur for this insect. The operator had to provide himself with a small brush of matting, or other similar material, and thus apply the sulphur to each separate leaf, rubbing off the insects at the same time.

This tedious manner of using sulphur being so unhealthy, and the impossibility of properly applying it to small and tender leaves without injury, induced many practitioners to abandon its use altogether; while others, seeing the certain results of its application, adopted the system of washing the flues with a solution of it: this answered very well until fire was lighted in the flues, the sulphur then ignited, and the destruction of vegetable as well as animal life was the consequence; an instance of which came under our knowledge when a boy.

The System at present in use for its destruction, was adopted upwards of 40 years ago, by a near relative of ours, Mr. James Hereman, at that time gardener to John Wright, Esq., Lenton House, near Nottingham; he shortly afterwards made his system known to all his surrounding neighbours, and it was soon generally practised by all the gardeners in that neighbourhood; and it has for the last 20 years become an almost universal system.

Take half a pound of flower of sulphur, put it into a watering pot, and add as much water as will make it into a paste, afterwards add more, until sufficiently thin, pour it into a garden engine, or other vessel capable of holding four or five gallons, then add as much water as will make it into four gallons. Water the infested plants with this overhead, either with a syringe, garden engine, or watering pot, (the two first are best,) and repeat the application until every insect disappears.

ACARUS HOLOSERICEUS.

SCARLET SPIDER, OR PLANT MITE.—*Plate* 2, *Fig.* 1.

ORDER. *Aptera.* DIVISION, *Acaridæ.*

This insect has often been confounded with the A. telarius, and has been considered productive of much injury; as far however as we have observed, it is perfectly harmless, at least to stove plants. Its habits differ widely from those of the *telarius,* being solitary, and never being found in a society of more than four or five; it forms no web, or fixes on any particular plant or leaf for its residence; whereas, on the contrary, the A. telarius associate in innumerable quantities, form webs, and fix their residences on particular plants and leaves.

It is much larger than the telarius, as shown in the natural size, by the large dots on the plain leaf, and of a different shape, as seen in the microscopic figure 1.

ONISCUS ASELLUS.

COMMON WOODLOUSE.—*Plate* 3, *Figs.* 1, 2, 3.

ORDER, *Aptera.* DIVISION, *Oniscidæ.*

This insect is very injurious, and where very prevalent is not readily got rid of; it shuns light, particularly that of the sun, and commits its depredations during the night; immediately after the sun has set, and the shades of evening draw near, it cautiously creeps from its place of retreat, and commences feeding on leaves, flowers, fruits, or whatever else falls in its way; and if not wholly destroying what it attacks, it so injures and disfigures them, that they with difficulty recover.

The body of this species of Woodlouse is about half an inch long, and quarter of an inch broad, of an oval shape, and of a dark mouse colour. It has fourteen legs, seven on each side, and two short feelers; round the outer edge of the back are eight or nine

spots of a paler colour on each side, and the back is armed with a strong bright shell. If they are unable to escape quick when touched, they usually roll themselves up in a ball, and appear lifeless, until the apparent danger is over; this attempt to feign death is never practised by the young ones, and only by those full grown when they cannot otherwise escape.

They lay abundance of very minute shining eggs, of a very pale yellowish white: these appear to be hatched in a few hours after deposition. The young are a pale yellow, and though very small, begin to crawl slowly about; in a day or two they become very active, and change to a pale reddish brown colour, as shown in figure 1. When half grown they assume the same colour as the parents, but without the markings on the back, figure 2; they can then run very nimbly, and are remarkably voracious, devouring every thing eatable that comes in their way. From their exclusion from the egg until full grown they cast their skins, as they advance in growth, after the manner of spiders.

When full grown they become heavy, and less active; they also then appear to require less food than during their growth, they then resemble fig. 3.

To destroy the Woodlouse.—The best way of eradicating these insects, is to decoy them to assemble in such a situation in the house as that they can be readily destroyed. The means made use of to entice them are numerous, a few of them may suffice.

Poisoning them.—Mix a small portion of arsenic, lump sugar, and flour together, and lay it in common feeders, which place in suitable situations, and cover each over lightly with a little hay or dry moss; examine the feeders occasionally, and remove the dead insects.

To entice by Crumbs of Cheese.—Get a piece of old cheese and grater it fine into a feeder, sprinkle it over with a little powdered lump sugar, cover the feeder over with hay or moss as before; examine every morning, and destroy the woodlice.

To entice by Fruit.—Get some slices of ripe fruit, as apricot, plumb, pear, apple, or any sort afforded by the season, always however adding a little lump sugar, if the fruit be sour; place in a feeder, cover, and examine as before.

To entice by Bean Stalks.—Cut up old bean stalks in

lengths about nine inches each, and lay them in different parts of the house; blow them every morning, and destroy the woodlice.

To decoy with Bryony Root.—Cut up Bryony root, (Brionia dioica,) into slices, put in feeders, cover the feeders with hay or moss as before, examine regularly, and destroy the woodlice.

To decoy merely by Shelter.—When there is not much shelter in the house infested, place handsfull of hay or dry moss here and there every evening, remove them away in the morning, and destroy the woodlice.

A live Toad kept in the house will keep it free from them.

The Beetle Trap also is an effectual destroyer of them.

CULTIVATION OF PALMS.

Nearly all Palms are very easy of culture, but to make them grow with any thing like freedom, three objects must be kept in view:—

1. That a strong heat, with great humidity, is indispensable.

2. That the pots containing the plants must be larger in proportion than for other plants, as their roots materially suffer if cramped.

3. That their foliage must not be crowded amongst that of other plants, or the leaves will lose their colour, and always look ragged and unsightly.

Propagation.—The greater number of species are increased by seeds, which are imported from the tropics; some propagate by suckers and division, and others by scales from their bulb-like stems.

a Propagated by seeds imported from their native countries.

Acrocomia,	Borassus,	Desmonchus,
Areca,	Calamus,	Diplothemium,
Astrocaryum,	Caryota,	Elæis,
Attalia,	Cocos,	Elate,
Bactris,	Corypha,	Euterpe,

Geonoma,	Livistonia,	Phœnix,
Gomutus,	Lodoicea,	Sabal,
Hyphæne,	Maximiliana,	Seaforthia,
Kunthia,	Manicaria,	Syagrus,
Latania,	Mauritia,	Taliera,
Licuala,	Nipa,	Thrinax,
Leopoldina,	Œnocarpus,	Wallichia.

b Propagated by suckers and division.

Chamædorea,	Phœnix,	Sagus.
Cycas,	Rhapis,	

c Propagated by scales from the stem.

Cycas,	Zamia.

The seeds of nearly every kind are extremely hard, and in most cases when they are to be sown, it is necessary to cut or file a piece off the outer shell at the vegetating end, to assist the protrusion of the radical.

The seeds should always be planted singly in pots, suited to their size, for the young plants are very impatient of being transplanted.

When sown, plunge the pots in a brisk heat, and keep the soil in a moderately damp state.

Suckers merely require separating, as in other plants, and when potted to be plunged in a brisk heat until started.

By scales from the stem.—This is a method practised for the species of Zamia and Cycas, the propagation of which, though not strictly palms, have similar habits, and are generally confounded with them, and subjected to the same general treatment.

The method is this—destroy the centre of the large bulb-like stem by scooping it out, fill up the cavity with dry sand to prevent it perishing by the lodgment of water, and in a short time the scales will produce leaves and roots; separate them carefully, and pot them in small pots. This, though a ready way of increasing these species, nevertheless destroys the parent; it is therefore preferable, if possible, to increase by suckers, unless a stock is required.

GENERAL CULTURE.

The situations in which palms are found in their native countries, point out the method to be pursued for successful culture in our stoves.

1. The greater part are found growing in low plains, where there is a high temperature, and great humidity, either arising from copious springs of fresh water, or the overflowing of small rivers during the rainy season.

2. A smaller part are found in a similar temperature, but in situations less subjected to moisture; these are almost invariably found either in clusters, where they shade each other, or are partially sheltered by other trees.

3. A still smaller number are found in more dry and elevated situations, where they have rather a lower temperature, and less moisture at their roots.

4. In whatever situations their roots are fixed, all are subjected during the rainy season to strong heat and great humidity, and during the dry season to a lower temperature, and more or less drought.

5. Although the roots of most species of palm run horizontally near the surface, yet the soil in which they grow is almost invariably deep and rich.

These five circumstances point out the mode of culture to be as follows:

Temperature.—From 90 to 100 degrees of heat during the summer months may be given with great benefit, provided the plants are kept well watered at the roots, and syringed overhead. In all the winter months keep them rather dry, being guided by the general rules for moist and dry stove plants.

Soil.—A good rich loamy soil, the top spit from a pasture, mixed with one-fourth of very rotten dung, will make them grow fine and rapid.

Potting.—Never allow the roots to become in the least degree matted; but rather overpot them, as the roots are much disposed to spread. In other respects follow the rules given before for stove plants.

PECULIARITIES IN THE CULTURE OF STOVE SHRUBS.

CULTURE OF THE GENUS AUBLETIA.

The whole of this genus is very ornamental and well deserves cultivation. The species usually go by the name of Apeiba.

They are natives of South America, and other tropical countries, where some of the species form large timber trees.

Soil.—The most suitable soil for them is composed of equal parts of heath mould and light loam from a pasture, and one-fourth of leaf mould; let the two first be finely broken, but the last well sifted.

Flowering.—In nearly every collection where they are found, they grow to a large size without flowering. Two ways are usually resorted to;—*first,* many persons cramp the roots in small pots until the plants, by being stunted in growth, show a disposition to blossom; the plants are then repotted, the outside of the balls being a little loosened with the hand, to allow the roots to start freely. *Second,* others resort to ringing; that is, taking off a ring of the bark, about half an inch broad, quite round the branches they wish to throw into flower. Both ways are successful, and the plants sustain little injury, if the check to the supply of nourishment is not too great.

Propagation.—Always allow the cuttings to be well ripened before separation, plant them in pots of sand, cover with a bell or hand-glass, and be careful to admit a little air for a short time every day, by propping up the glass about half an inch on one side.

CULTURE OF THE GENUS BROWNEA.

This is a very splendid genus, with brilliant scarlet flowers. All the species are of rather slow growth, and their foliage is easily injured.

They are chiefly natives of shady thickets in the West Indies,

where they form close evergreen shrubs, from eight to twelve feet high.

Temperature.—They require a strong moist heat, or they will not flower. About the temperature and humidity of the Orchideæ house suits them well.

Watering.—During summer, when they are in a free growing state, a good supply of water at the roots is indispensable; also, often sprinkling overhead is of great benefit. But in winter they must have a lower temperature, and be kept rather dry at the roots, or they will lose all their foliage, if not entirely perish.

Soil.—A light sandy soil, mixed with about one-fourth of well rotted leaf mould, is a very good compost for them.

Propagation.—Cuttings strike root freely if planted in sand, and covered with a bell glass; plunge in a cucumber frame in preference to a tan bed, and take care that no leaves are shortened.

CULTURE OF THE GENUS BUTEA.

Three species of this genus are at present known, all natives of the East Indies, very splendid, and bearing pea-shaped flowers, of a brilliant scarlet, not unlike those of the Coral-tree, (Erythrina.) They ought to be in every collection, but are at present found in very few.

Soil.—They grow freely in a soil composed of two parts light rich loam, one part leaf mould, and one part heath mould, broken fine, or sifted through a coarse sieve.

Temperature.—A strong heat is required to bring them to perfection, therefore is is preferable to place them at the warm end of the house.

Watering.—Give a liberal supply when they are in full growth, and occasionally syringe in fine weather. But during the dark weather of winter, keep them rather dry than otherwise.

Propagation.—Separate cuttings at a joint when half ripe, cut off no leaves except to allow of insertion in the pot, plant in a pot of fine sand, plunge in a bark or dung bed where there is a brisk heat, and cover with a hand-glass. Be careful to give sufficient room for the leaves, or they are liable to damp off.

CULTURE OF THE GENUS DILLENIA.

A splendid genus, one species only of which (D. speciosa) has yet found its way into our collections. It is a native of the East Indies, and bears large splendid yellow flowers, and in its native country grows to a good sized timber tree; in our hothouses it is found as a small shrub, often with its leaves brown, and apparently scorched, as if for want of water.

Temperature.—Strong heat, and shelter from direct sunshine, are requisites for the health of this plant, for if the house sinks below 58 degrees the leaves will show it, and probably fall off, and if the direct rays of the sun fall upon it, the leaves are liable to curl up, and die at the edges. Place it at the warm end of the house, and shelter it partially with other plants.

Fumigation.—Care must be taken, when the houses are fumigated with tobacco for the destruction of Aphis, that this plant be not subjected to the smoke, or the leaves will become withered, and drop off.

Propagation.—This may be effected by ripened cuttings, planted in a pot of sand, and plunged in a hotbed under a hand-glass; but by no means cut off the leaves, or success will be very precarious.

CULTURE OF THE GENUS GUSTAVIA.

Only one species of this genus has been yet introduced, and from its beauty it ought to be in every stove; very few, however, possess it.

It belongs to the Myrtle tribe of plants, and bears like the rest of the tribe white flowers.

Temperature.—The culture is simple and easy, but it requires a strong heat and humid atmosphere when in a growing state, and a heat not below 60 degrees during the winter, with but little moisture.

CULTURE OF THE GENUS BARRINGTONIA.

The B. speciosa is a splendid plant, and the only species of Barringtonia we possess in our collections. It was introduced many years ago, but from the difficulty of keeping it healthy it has been well nigh lost in the country several times. It is a native of the East Indies, where it grows to a good sized tree, flourishing most on the sides of running streamlets of water, where it spreads out its broad shining leaves, and produces its splendid scarlet flowers.

Temperature.—A strong heat is required to keep it healthy, from 75 to 100 degrees, during the season of growth, and never lower than 60 during torpidity, or the leaves will immediately become blotched and unhealthy; place this plant therefore at the hottest end of the stove, and do not allow the sun to shine too violently upon it.

Watering.—During the season of growth, it requires as much moisture in the atmosphere as Orchideæ, and a good supply at the roots; also syringe every day in sunny weather, but during torpidity keep the soil in the pot partially dry, and never syringe.

Soil.—One-half good rich loam from a pasture, one-fourth heath mould, and one-fourth leaf mould, form the best compost. In potting, give plenty of pot room.

Propagation.—Take off the cuttings from the ripe wood, trim them at a joint, but do not shorten any leaves; plant about two in each pot of sand, plunge the pots in a moist heat, and they will soon strike root, if covered with a hand-glass.

CULTURE OF THE DAMMARA ORIENTALIS, (PINUS DAMMARA.)

This plant is remarkably scarce, although when once established it grows freely; but if crowded amongst other plants, it is liable to lose its foliage.

Temperature.—Place it at the cool end of the house, and in winter treat it as other stove plants of similar habits.

Soil.—A light loam, mixed with one-fourth of heath mould, suits them well.

Plate 6

S. H. Del. — Meyoruk. sc.

PROPAGATION.—The usual way of increasing it is by cuttings, separated when the wood is ripe. Plant two or three in a pot of very fine sand, plunge in a tan bed, and cover with a hand-glass. If ever they are planted thick, they immediately perish.

CULTURE OF THE STOVE SPECIES OF ACACIA.

Many of the Acacias being natives of the tropics, require the heat of the stove. The only peculiarity attending their culture is in propagation. When the young cuttings have struck root, and are potted off, they die; this may be prevented by placing them for a few days after being potted under a hand-glass, in a warm situation; as soon as they have begun to grow give them air, and gradually expose them to the temperature ofthe stove.

CULTURE OF THE GENUS BAUHINIA.

The only peculiarities attending the culture of the species of this genus consist in the cuttings, which should be made from half ripe wood. Plant the cuttings in pots of fine sand, all strong growing kinds in a pot by themselves, and the more delicate kinds by themselves in another; plunge the strong growing kinds in a hot-bed, but the more delicate ones set on the surface of a bed; place a hand-glass over those plunged, but a bell-glass is closer, and answers better for the more delicate kinds.

CULTURE OF THE GENUS BOMBAX.

Be careful not to plant the cuttings too thick in the pot, or from the softness of the wood they are liable to fog off.

CULTURE OF THE GENUS BREXIA.

These are fine plants, and not uncommon in our collections.

Potting.—In potting give plenty of room for the roots, or the plants will soon appear stunted.

CULTURE OF THE GENUS ERYTHRINA.

This is a splendid genus; upwards of 40 species have already been introduced into our stoves; scarlet is the prevailing colour of the flowers. When in blossom the plants have a very conspicuous and imposing effect.

All the species are considered stove plants, but crista-galli, laurifolia, caffra, herbacea, nana, and perhaps several others, will flower very finely in a warm border out of doors.

All the species that will flower in the open air must still be considered stove plants, and require a treatment, if put out of doors, very similar to that of herbaceous plants, which may be stated as follows :—

About the end of April, cut down the last year's shoots to three or four eyes, according to their strength, take off a large portion of the old soil from the roots, and re-pot them.

Soil.—Light rich loam from a pasture, mixed with one-fourth of rotten hot-bed dung, let these be well beat and broken together, and if they cannot be broken fine enough, sift them through a coarse sieve.

Heat.—When potted plunge them in a brisk heat until the roots have begun to grow freely, and the shoots have become six inches long, then first take them from the tan, and afterwards remove them to a house of a lower temperature, and harden them gradually to the air, keeping them under glass until the flower buds are formed.

Water.—During the whole season of growth give a good supply of water to the roots, and syringe every day over head, this will keep them free from the red spider, to which they are very subject.

During the time of their torpidity keep them quite dry, until the season of growth again.

Placing out of doors.—When the flower buds are formed plant them in a warm border, and they will flower finely in July. As soon as the first crop of flowers have faded, cut down the stems,

they will immediately form new shoots, and if the season be fine they will flower again about the end of September; they may afterwards be taken up and potted, and put under shelter, and be allowed to become perfectly dry and torpid until the following April, then re-pot, and dress as directed before.

If it is inconvenient to pot them in the Autumn, and take them into the house, they may be easily protected by covering their roots with a little litter on the approach of winter.

The culture of all the other species may be summed up thus :—

Pot them in the same soil as recommended for laurifolia, cristagalli, &c. Give them three months rest in winter, by placing them in a dry, cool situation in the house, and not watering them more than once a week. As soon as they show a disposition to grow, repot them, increase the quantity of water at the roots, and when the flower buds begin to be formed, plunge them in a strong heat, and they will flower fine.

ON THE CULTURE OF THE RUSSELIA JUNCEA.

The usual season of the flowering of this plant is during the summer months, from the end of May till the beginning of September; but by the following mode of culture it may be brought into flower at almost any season of the year.

Propagation.—It may be propagated both by cuttings and layers, which may be inserted in a mixture of leaf mould and peat, at almost any season of the year, but they grow the quickest if planted in March or April.

Make the Cuttings of the young wood, cutting them off at any length deemed most convenient, plant them in a pot of soil as above, and plunge the pot in a hot-bed, with a brisk heat, and if the cuttings are covered with a bell glass they will strike the readier; if the heat is a moist one, and a glass be put over them, they need scarcely be watered until after they are potted off. The time required to strike them is about three weeks, and never exceeding a month.

Layers merely consist of covering some of the shoots with soil in the pot the plant grows in, and in a month or six weeks they will be ready to separate.

Soil.—The best soil is a mixture of sandy heath mould, and finely sifted leaf mould.

Situation.—During their season of growth give them a good stove heat, and syringe them overhead every day, and continue this process, potting as often as the plants repuire it, until they have grown to a good size, say a foot and a half or two feet high, which will be in about two months; then remove them to a greenhouse or other cool situation, where they are not exposed to the outer air, not only cease to syringe, but give very little water at the roots.

When the plants have stood in this cool temperature about three weeks, (which should never exceed 60 degrees, or be below 45), remove them again to the stove, plunge them in the tan bed, or other convenient bottom heat, give them about 70 degrees temperature, and abundance of light and sunshine.

In this increased temperature again renew the syringing, and occasionally water at the roots with clear, but weak, liquid manure, and abundance of flowers will speedily be produced.

CULTURE OF THE GENUS BRYOPHYLLUM.

Only one species of this genus is in our collections; it is succulent, and belongs to the natural order Semperviveæ.

Soil.—A good rich loam, mixed with one-fourth of very rotten leaf mould.

Temperature.—It will grow in any common stove, but will not flower freely unless plunged in a good bark bed.

Watering.—Give very little water at any time except the season of vigorous growth.

Propagation.—A leaf separated, and laid flat on a pot of soil, will strike root freely from the notches of the edges.

CULTURE OF THE GENUS CALYPTRANTHES.

This genus belongs to the myrtle family, four species only are known; they are very easy of culture, requiring only to be kept in a good moist heat, during their season of growth.

All the species propagate with difficulty; layering is generally resorted to, as the most certain means of increase. Cuttings of the ripe wood, planted in autumn, in a pot of fine sand, and covered with a bell glass, will answer. Place the cutting pot in a dry, cool situation, until the following February, then plunge in a brisk, moist heat.

CULTURE OF THE GENUS IXORA.

These beautiful plants require a good moist heat to grow them to perfection, they will not however endure to be plunged in a bed of fermenting materials.

They are very liable to be infested with Aphis, the leaves often require to be sponged, to keep the plants healthy.

They often perish in winter from over-watering; place them in a moderately cool and shady situation, and allow them to become rather dry than otherwise; if they are ever placed on a warm flue, where copious waterings are required, they soon die.

CULTURE OF THE STOVE SPECIES OF PASSIFLORA.

1. All the stove species of Passiflora, thrive best in a strong moist heat, and require a good supply of water when in a growing state.

2. The strong growing kinds, as quadrangularis, edulis, alata, Buonapartea, &c. should be planted in a good rich loam, with one-fourth of rotten dung; but the more slender species should have a good portion of heath mould mixed with the above.

P. Quadrangularis.—This does best planted where it receives bottom heat, either by plunging in a tan bed, or by connection with

a warm flue. Cut it well in every autumn, after it has done flowering, after the manner of a vine; renew the soil, either wholly or in part, every spring, just before it starts to grow, and when in flower give a great supply of water. If impregnated with the pollen of P. cœrulea, it will set fruit freely. The fruit are egg-shaped, somewhat larger than a good jargonelle pear, orange-yellow outside, the pulp watery, fragrant, betwixt sweet and acid, and rather pleasant to the taste; it is generally eaten with wine and sugar. With the above treatment, we have a large crop of fine swelled fruit at Narrow-Water this year.

P. ALATA will grow in almost any situation, planted under the floor, or in any waste corner of the stove; it will grow, and flower, and fruit in abundance, if impregnation be attended to.

P. EDULIS is nearly hardy enough to endure the greenhouse, but it will not ripen its fruit in any situation except the stove; the fruit is purple, acid, with rather a peculiar flavour, much eaten in its native country.

P. KERMESINA.—This brilliant little species is a very free flowerer, easily fruited, and easily propagated by cuttings of the old wood. The fruit is pear shaped, and when ripe has a handsome appearance.

P. PRINCEPS *(racemosa)* is a profuse flowerer, and is but seldom seen bearing fruit; if however the pollen of P. quadrangularis be used, it sets very well.

The kinds most deserving of attention, are P. quadrangularis, alata, Buonapartea, edulis, princeps, kermesina, Loudonii, phœnicea, laurifolia, and maliformis.

CULTURE OF THE GENUS SOLANDRA.

The habits of this genus are much like those of Brugmansia, but although they grow rapidly, they do not flower freely. Give the roots plenty of pot room, a good supply of water when in a growing state, and keep the leaves free from insects; when the plants have grown a good size, check them by withholding water, and although the leaves will for the most part fall, a good supply of

flowers will generally be produced; when these begin to show, water freely as before.

Propagation.—Cuttings root with great freedom if made of the half-ripened wood, and merely stuck in a bed of tan, or planted in a pot of soil.

The Peculiarities in the Culture of the remainder of Genera, marked in the foregoing Lists, are as follow:—

1. Requiring a high temperature during the season of growth, and not below 60 degrees in winter.

Astrapæa,	Desmodium,	Portlandia,
Baphia,	Hibiscus,	Sesbania,
Brownlowia,	Isertia,	Tetracera,
Clitoria,	Loreya,	Thunbergia,
Combretum,	Poinciana,	Walkeria.

2. Requiring a strong moist heat during the season of growth and flowering, but in winter will endure as low a temperature as other stove plants.

Aphelandra,	Clidemia,	Geissomeria,
Brexia,	Gardenia,	Hymenodictyon,
Clerodendron,	Genipa,	Melhania.

The Gardenia, Clerodendron, Aphelandra, and Melhania, are peculiarly liable to be infested with the Aphis; the leaves must be kept free and clean or the insects will thrive.

3. During the season of torpidity to be kept rather dry, for if treated as other stove plants, they will either not flower, or perhaps perish from moisture.

Arthrostemma,	Jacaranda,	Melastoma,
Bouvardia,	Jatropha,	Mimosa,
Burgmansia,	Janipha,	Pergularia,
Columnea,	Lagestræmia,	Scævola,
Conostegia,	Miconia,	Talinum.

4. Plants requiring to be treated more hardily than stove plants generally, although they will not endure the greenhouse.

Andromeda,	Pæderia,	Schotia,
Chilopsis,	Pelargonium,	Selloa.
Nyctanthes,		

Of Andromeda, four or five species are from the West Indies, but are nearly hardy enough for the greenhouse; of Pelargonium only one or two species belong to the stove.

5. Plants, the cuttings of which are remarkably liable to damp off, plant them thin, and often wipe the glasses to keep them as dry as possible.

Annesleia,	Chætocalyx,	Guaiacum.
Calotropis,	Cryptolepis,	

THUNBERGIA ALATA ALBA.—*Plate* 2, *Fig.* 1.

White flowering winged Thunbergia.

This plant is a native of the East Indies, is a rather tender stove climber, and when in flower is surpassed in beauty by few. The inside of the tube of the flower is deep purple, and the expanded segments a delicate white.

Soil.—The best compost is heath mould one-half, sandy loam one-fourth, and leaf mould one-fourth.

Watering.—Give a good supply in summer, when in full growth, but give very little in winter; also during hot weather syringe often over the leaves, as the plant is very liable to be infested with the Red Spider, (*Acarus telarius*, plate 2, fig. 2.)

Propagation.—Seeds are the best if they can be obtained; the plants thus raised endure the winter better than those struck from cuttings; but if seeds cannot be obtained, select cuttings of the half ripened wood, and plant them in pots of sand, plunge them in heat, and cover them with a bell or hand-glass.

Temperature.—Place them in a warm part of the stove at all times; they will thrive wonderfully in large pots on a warm flue during winter, flowering freely during the whole of that dreary and dark season for flowers.

Insects.—Should the red Spider become prevalent upon them, sprinkle the plants overhead with a little sulphur and water.

MANETTIA GLABRA.—*Plate* 2, *Fig.* 2.

Smooth-leaved Manettia.

Synonyms.—Manettia cordata, of many gardeners; Manettia cordifolia.

This beautiful stove climber belongs to the natural order Rubiaceæ, and is a native of Buenos Ayres, where, according to travellers from that country, it hangs from the trees in vast festoons of flowers.

Soil.—The soil in which it thrives best, is one-half heath mould, one-fourth leaf mould, and one-fourth sandy loam.

Temperature.—Although the stove is the most congenial situation for this plant, yet it is sufficiently hardy to endure the greenhouse, but its flowers in the latter place are weakly, and by no means show the natural beauty of the plant, as when grown in an increased heat.

Propagation.—Cuttings strike root freely, if they be made from the half-ripened wood, and planted in pots of sand, and covered with a bell glass in heat.

CYPRIPEDIUM INSIGNE.—*Plate* 3.

The admirable Ladies' Slipper.

This splendid species of Orchideæ is a native of Nepal, from whence it was introduced by Dr. Wallich, in 1818.

Soil.—It is a terrestrial species, and thrives well if potted in equal parts of rotten leaf mould, and sandy heath mould.

Temperature.—A common stove will answer well, if the plants are placed under the shade of other plants.

Propagation.—It is readily increased by separation of the roots.

Insects.—All Orchideæ are very liable to the attacks of Wood-lice. To destroy them, *see page* 62.

EUPHORBIA JACQUINIFLORA.—*Plate* 4, *Fig.* 1.

Jacqinia-flowered Euphorbia.

Amongst the many beautiful species of Euphorbia introduced of late into our collections, perhaps none is more deserving of attention than the present subject; whether we take into account the vast profusion of flowers it produces at the most dreary season of the year, or the brilliant scarlet of their colour, contrasted with the dark and graceful foliage; to these may be added, that it suffers not from the attacks of insects, is seldom diseased except from over-watering, and grows with freedom under the most common treatment of stove plants.

Soil.—Equal parts of heath mould and very rotten leaves are a good compost.

Propagation.—Cuttings are made of wood nearly ripened, cut them into the desired lengths, plant them in a pot of fine sand, and plunge the pot in a warm tan bed, but do not cover them with a glass or they are liable to fog off; like all other succulent species, they are more liable to perish if planted when the wounds occasioned by the knife are fresh, allow them therefore to dry a few days previously to planting, and water sparingly until they are struck.

JASMINUM SAMBAC.—*Plate* 4, *Fig.* 2.

Zambac, Moutlee, or Chinese Jasmine.

This very fragrant plant has been long in our collections, and though not remarkably showy, yet is sufficiently so to entitle it to a situation in every plant stove.

The flowers are pure white, changing before they fall to a dark purple. The plant is a free grower, and when once established in a situation will cover a large surface of trellace, and flower in immense profusion every year, filling the house in which it grows with the most delicious odour.

Temperature.—The stove is the proper temperature for this plant, but it will grow in a warm part of the greenhouse, but is apt to look sickly and seldom flowers freely.

It increases readily by cuttings planted under a glass, in heat.

It is liable to become infested both with the brown and white scale, which may be eradicated, as shown in pages 3 and 54.

GENERAL CULTURE OF TRUE SUCCULENTS.

In treating on the culture of Succulents, it is necessary to distinguish them by two kinds.—1st. Such as thrive best in a much lower temperature than stove plants generally, and flower more freely if exposed to the open air, from the middle of June to the middle of September; and, 2nd. such as require nearly as much heat as other stove plants during the time of flowering and growth, and will suffer if placed out of doors in summer.

Of the first kind are the following genera:—

Aloe,	Echinocactus,	Opuntia,
Cacalia,	Cereus,	Pereskia,
Cactus,	Mammillaria,	Rhipsalis.
Epiphyllum,	Melocactus,	

The culture of these kinds may be stated thus:—

1. Soil.—Pot them in plain sandy loam, with one-fourth of lime or brick rubbish mixed through it, but without any dung.

2. Potting.—Let the pots in which the plants are placed be small, and be careful to drain them well.

3. Watering.—During the season of their torpidity scarcely any water is required, but at the season of growth and flowering once or twice a week, if the weather be sunny, it should be supplied.

4. Exposure.—About the middle of June place them in a

warm and sunny situation out of doors, either placing a slate under each pot, or setting them on a prepared floor, to prevent worms from injuring the roots. A little moss, placed among the pots, is of great advantage, by preventing the roots suffering from the heat of the sun.

Housing.—About the middle of September take in the plants, and place them on a dry exposed shelf, where they may remain, with scarcely any attention, until the following spring, when they will begin to grow and flower freely.

Of the second kind are the following genera :—

Caralluma,	Orbea,	Stapelia,
Euphorbia,	Piaranthus,	Tridentea,
Gonostemon,	Podanthus,	Tromotriche,
Huernia,		

The culture of these is as follows :—

1. Soil and Potting.—Pot in plain sandy loam, and brick rubbish, without any other mixture; and drain well, as recommended for the first division.

2. Watering.—At the time of flowering, if the weather be dry and warm, the plants will require water every day, but at other times, not above once a week, and in wet, dull weather, scarcely oftener than once a month.

3. Temperature.—Place them in an airy and exposed part of the stove, where they will receive a good heat, and have the sun's rays full upon them, and they will flower well.

CULTURE OF TROPICAL FERNS.

Propagation.—There are two methods of propagating ferns, *by division* and by seeds. The first is simply dividing the roots, and planting the divided parts: but in the second the following particulars should be kept in mind.

Two ways of sowing the seeds, (sporules) are followed by practical men; the first, though answering in many cases, is not so

certain of success as the second. The first method is to cover the pots with moss, after having sown the seeds on finely sifted sandy heath mould; for the second method of sowing the seed, take notice of the following rules:—

1. Burn the soil in an oven, or other conveniency, to destroy the seeds of weeds, or any wild species of fern.

2. Select heath mould of a sandy nature, and if necessary add a quantity of fine sand to it, and let the whole be sifted very fine.

3. Fill suitable sized pots up to the rim with the fine soil, and lay a few large pieces on the top, pressing them a little down, but not so as to destroy the inequality.

4. On this uneven surface sow the seeds, but do not cover them with any soil, set the pots in feeders, and place them in a hot and shady part of the stove, where the sun can never shine upon them, and they will soon grow.

5. From the extreme minuteness of the seeds, it is not advisable to place a bell-glass over them, as the condensation of moisture might destroy them, but a hand-glass, by allowing more room for the escape of the vapours, might be placed over them with advantage.

6. Never pour water over the surface of the soil; the best is to put a little into the feeders, and the soil will absorb sufficient for vegetation.

7. When the plants are sufficiently grown to pot off, take them up with great care, so as not to injure the roots, or some of the more delicate kinds will be a long time before they recover.

8. The best soil is sandy heath mould, mixed with a small portion of light loam from a pasture, and it is preferable to sift the loam pretty fine, before mixing it with the heath mould.

9. It is necessary that attention be paid to drainage, as the plants will not thrive if the water supplied become stagnant.

10. Place the plant pretty firmly in the pots, by pressing the soil about them, for although in their natural situations they often grow very loosely, yet they thrive better by being firm in the soil.

11. Water them with care, only at such times as they evidently require it; and occasionally syringe over the leaves to prevent the attacks of Red Spider, to which they are liable.

12. The situation they occupy should be shady; it is not

necessary that the sun should ever penetrate to them, and with very little attention they will thrive well.

How long the seeds of ferns will retain their vitality is unknown. A quantity of soil was removed at Narrow-Water two years ago, from a depth of nearly 8 feet, which must have lain undisturbed some hundreds of years, on being subjected to the heat of the stove, abundance of ferns were produced.

CULTURE OF STOVE AQUATICS.

True Aquatics, or such as require the roots to be totally immersed in water. See page 37.

These consist of the following genera :—

Euryale,	Nelumbium,	Pontederia,
Heteranthera,	Nymphæa,	Vallisneria,
Limnocharis,	Papyrus,	Villarsia.

The culture of each genus is as follows :—

EURYALE.

There is but one species (E. ferox) known, and it is an annual, with large spreading leaves, propagated by seeds, which should be sown in a pot of rich loam, and plunged in a cistern of water. As soon as large enough, separate and pot them, and when grown a good size plant them in the bottom of a tub or cistern.

LIMNOCHARIS, HETERANTHERA, PONTEDERIA, AND VILLARSIA.

These genera are all very easy of culture, merely requiring to be planted in pots of rich soil, and placed in a cistern or tub of water, and propagated by division of the roots.

VALLISNERIA.

Only one species of the V. spiralis is grown in our houses, and it is nearly hardy ; it is, however, a curious plant, and deserves a

situation in every collection of aquatics. It matters little how deep the water is, in which it is planted. Propagation is effected by seeds, which are produced freely.

NYMPHÆA.

1. The species of Nymphæa flower freely most of the summer, in a tub or cistern of water; and when they have done flowering the tops die down, and tubers are formed beneath the soil.

2. When dead down, separate the roots, and plant the separated pieces in small pots.

3. After potting, place them in a cistern of water for a little time, after which allow the water to evaporate, and keep the plants in a torpid state, administering little or no water until the end of February.

4. About the end of February fill up the tub with water, and place them in a brisk heat, and after they have begun to grow, plant them out in the bottom of tubs or large pots.

5. After being planted out, cover them at first with only about two inches of water, but as they advance in growth, increase the quantity until the tubs or pots are full, and they will flower freely.

NELUMBIUM.

These plants are propagated easily by both division and seeds. For the first see propagation of Nymphæa, and for the second notice the following remarks :—

1. Sow the seeds about the end of March, the shell of the seed being hard, file or cut off a piece at the thick end, to assist the escape of the radicle, and merely place the seed in a flower pot stand or basin of water.

2. When the first leaf is begun to be formed, plant each seed in a small pot of rich soil, and place them in a cistern of water.

3. In October the tops will lie down, then take the pots out of the water, and allow the soil to become nearly dry, and keep them in this torpid state until the following February, when they must again be prepared for growth and flowering.

4. About the beginning of February re-pot them in large pots,

and again place them in a tub of water as before, or the roots may be planted at once in the bottom of a tub.

5. If they are planted at the bottom of a tub, place about a foot depth of rich soil for them to grow in, and increase the quantity of water over them as they progress in growth.

PAPYRUS.

1. This plant requires only to be planted in a large tub, which during the growing season should be kept full of water, but after the plant has flowered allow the water to dry up, and only just keep the soil from becoming dusty, until the growing season again commences Propagate by division of the roots just when the plant is beginning to grow.

2. Plants not requiring to be totally immersed, Cephalotus, Dionæa, Drosera, Nepenthes, and Sarracenia.

NEPENTHES.

1. Pot the plants in chopped moss, and plunge the pots over the rim in a bed of thin sand, placed on a warm part of the flue, and keep the bed in which they are plunged very moist.

2. Never neglect to syringe every sunny day during summer, but let the water be new milk-warm.

3. Either allow the shade of other plants to break off the direct rays of the sun, or purposely throw a net over the glass to effect this purpose, for any direct exposure will injure, if not destroy them.

EPHALOTUS, DIONÆA, DROSERA, AND SARRACENIA.

These are all dwarf plants, and more hardy than Nepenthes, but they will not thrive in a dry airy greenhouse; the best way is to place them in a cool part of the stove, and treat them as follows:—

Pot them in chopped moss and peat, or bog soil mixed: if bog soil cannot be obtained, heath mould will do. Plunge them in a bed of moss, and keep the moss very moist, as for Nepenthes; cover with a hand-glass, allowing a trifle of air, and if kept from direct sunshine they will grow freely.

Plate 7

CULTURE OF STOVE PERENNIALS.

Although Perennials are of various kinds, (page 22,) yet their general culture may be considered under two heads. 1st. those, the tops of which wholly die down, called *"Deciduous Perennials;"* and 2nd. those, the tops of which only partially die, called *"Evergreen Perennials."*

The first kind includes the various bulbs, greater part of tubers, and some herbaceous species.

The second kind includes all whose tops continue green, after the general season of growth and flowering is over.

1. DECIDUOUS PERENNIALS.

Deciduous Perennials are either bulbous, tuberous, or herbaceous.

a Bulbs.

For the successful culture of bulbs, six rules are necessary, viz. soil suitable to the nature of each plant; care in potting; a proper application of heat; due attention to watering; light sufficient to perfect the leaves; and a proper season of torpidity, called "wintering."

Soil.—A mixture of light sandy loam, very rotten dung, and heath mould, equal parts, is perhaps as good a soil as can be got for general purposes, but weak growing kinds should have a larger proportion of heath mould, and very strong growing kinds a larger proportion of loam. It it always advisable to sift it before using.

Potting.—The season for potting is immediately when the bulbs begin to show indications of growth. Always give a good drainage of broken crocks; and never plant bulbs more than one-half their depth in the soil.

Watering.—During the whole season of growth, give an abundant supply of water; but when the leaves are full grown, begin to diminish the quantity, and finally, during the season of torpidity, allow them to remain perfectly dry.

Light, to perfect the Leaves.—After the flowers have fallen, place the plants in an exposed and warm part of the stove, and encourage as much as possible the growth of the leaves, for on their perfection depends the success of the following season.

Wintering.—When the leaves change to a yellow colour, remove the plants to a cool situation, where they may remain, perfectly dry, for three months, after which re-pot, and remove to a strong heat, as before.

b Tubers.

Follow the directions given for bulbs in every particular, except that of planting. Tuberous roots are planted beneath the soil, whereas bulbs are only partially covered.

c Herbaceous.

Herbaceous plants are either potted entire, or divided with a knife, but are never separated at their roots, after the manner of bulbs and tubers; in other respects, the rules for bulbous plants are applicable to these.

2. EVERGREEN PERENNIALS.

The only difference in culture betwixt deciduous, and evergreen perennials consists in this:—the former, during the season of torpidity, possessing no leaves, the soil in which they grow is allowed to remain perfectly dry; whereas, the latter having leaves during the whole year, require, during the torpid season, a limited supply of water to support them; but in temperature, and other particulars, treat as recommended for deciduous perennials.

CULTURE OF BIENNIALS.

The best season for sowing the seeds of stove biennials, is the beginning of August, so that the plants may arrive at a good size before winter. In other respects, they require precisely the same treatment as Annuals.

CULTURE OF STOVE ANNUALS.

1. Admitting one or two exceptions, the whole art of growing Annuals to perfection, consists in never allowing them to be checked, until they arrive at their full size.

2. To accomplish this, sow in February and March, plunge in a brisk hot-bed, and when they have made two or three leaves, plant them in thimble pots, and shift regularly, until they are finally placed in the pots, in which they are to flower.

3. As a general rule, the best soil is equal parts of leaf mould, heath mould, and light loam, well mixed and sifted; but Balsams, Cockscombs, and Capsicums, when advanced in growth, require to be potted in a soil much stronger.

4. From the time they are sown until they flower, a strong moist heat is advantageous, but after the flowers are expanded the heat may be diminished.

Peculiarities in the Culture of the Cockscomb.—Allow the plants to remain in 48 sized pots until they show flower, then pot those with the best shaped combs, in a size larger pots, and finally place them in 32's, the size in which they will flower.

From the time they show flower until full grown, allow them to stand very near the glass, to have a strong moist heat, and be plentifully supplied with water, in which the dung of sheep or fowls is dissolved; and after they are full grown, place them in a lower temperature.

Balsams may be grown remarkably fine, by plunging the pots in a hot-bed frame, where there is a brisk bottom heat, giving them abundance of air, watering with manure water, re-potting as often as requisite, and lastly, thinning out the small flower buds.

GENERAL OBSERVATIONS ON TROPICAL ORCHIDEÆ.

As the treatment of this singular tribe of plants will be explained at large in a separate volume of the Library, we shall only

notice here a few prominent rules, by which a person possessing a few specimens, may grow them to his satisfaction; but where an extensive collection is required, we recommend reference to be made either to our volume on the subject, or some other work of a practical cultivator.

Orchideæ are of two kinds. Those found in their native countries attached to the branches and stems of trees, called "Epiphytal," and those found growing naturally in soil, called "Terrestrial."

EPIPHYTES.

1. Temperature.—From the middle of October to the beginning of March, which is the *season of growth,* they require from 80 to 90 degrees by day, and 65 to 75 degrees by night; but from the end of October to the beginning of March, which is the *season of torpidity,* from 55 to 65 degrees are sufficient.

2. Watering.—In their native countries the season of growth is the rainy season, and the season of torpidity is one of drought. Therefore every day, from March to October, keep the air of the house very moist; but from October to March keep the air dry.

If the air be kept sufficiently moist, little water will be required at the roots of the greater part, and that little should be supplied round the edges of the pot, without pouring it over the leaves.

Whatever water be supplied, it is indispensible that it should be, at least, new milk warm, for cold water will invariably be injurious.

Many of the strong-growing species will be benefitted by syringing over the leaves on every hot day.

During the season of torpidity, the temperature being low, it is indispensible that the plants be kept dry, receiving no more water than is necessary to keep them from perishing.

3. Soil.—The best kind of soil is sandy heath mould, cut into pieces about an inch square, and mixed with about one-fourth of broken crocks. Many species, however, flourish better if planted in spagnum, (moss,) chopped fine, and well drained.

4. Pots.—As a general rule, select pots rather large in proportion to the size of the plants, and never use hard baked ones.

5. Drainage.—Fill from one-third to one-half the pot with

broken crocks, that any possibility of injury from stagnation may be prevented

6. Potting.—The proper time for potting is at the close of the season of torpidity, which, as a general rule, occurs about the beginning of March. But this rule admits of many exceptions, some becoming torpid at one season, and others at another; but all must be allowed to dry, and receive no water for several days previous to potting.

If the plants are placed deep in the pots they do not prosper; place them on a little hillock of soil, raised above the top of the pot, to prevent the plants falling over, and tie them to a small stick, inserted firmly into the soil.

The Stanhopeas, and some other species, the flowers of which proceed out from the roots nearly horizontally, require elevating six inches above the rim of the pot. This is readily done by piling pieces of soil one upon the other; and to prevent their falling, insert a small peg in each piece.

Many species grow freely fastened to pieces of rotten wood. All that is required, is to tie a little moss round the bottom of the stem with fine wire, and hang them up from the roof.

7. Shading.—Nearly all Orchideæ suffer if exposed to the rays of the sun; therefore, for successful management, it is indispensible to shelter the roof with netting, canvas, or any other convenient material.

8. Propagation.—Separate one of the pseudo-bulbs with a bud upon it; or if it is not the habit of the plant to bear bulbs, take off a piece of the rooted stem, and plant it as recommended before.

TERRESTRIAL.

1. Soil.—Equal parts of sandy heath mould, and leaf mould well mixed and sifted, is the best compost for them.

2. Temperature.—With a few exceptions, the various kinds of terrestrial Orchideæ, require the same temperature as Epiphytes.

3. Torpidity.—Give all a season of rest, like Epiphytes. Be guided in the various species by the dying of the leaves; when these begin to decay remove the plants to a cool place, and gradu-

ally supply less water until the leaves are dead, then keep them dry until they show a disposition to grow.

4. Potting.—The general time for potting is immediately after the season of torpidity, but the plants must be shifted whenever the pots become filled with roots, just after the manner of perennials, and other stove plants.

5. Watering.—During their season of growth, water just after the same manner as you would tender Perennials.

In all other respects treat them the same as Epiphytes.

REMARKS ON THE

ERECTION AND PROBABLE EXPENSE OF BUILDING SMALL HOTHOUSES.

No. 1.—*Plate* 5.

If it is desirable to erect a small Stove, which will contain a few plants, 60 or more good pines, and a crop of grapes, the annexed plan, (Plate 5,) explained in the following remarks, will, at a small cost, perfectly answer the intended purpose.

1. *Situation of a Hothouse.*—In building a hothouse always select a situation as dry as possible, and if not naturally dry, make it so by good drainage; for if the ground beneath the house is wet, vapours arise when the house is closed at night, which cause the tender plants to damp off, and the grapes to ripen of a bad flavour and colour.

2. If possible select a *south aspect,* for the further the house is placed from this, the less power has the sun upon it, and the more firing is consumed without corresponding advantages.

3. *Materials for Walls.*—The best materials for the walls are

bricks, but if the district is stony, stones may be used, but face the walls inside the house with bricks, as a wall of stones only, will scarcely ever be dry, which is a great disadvantage.

4. *Make the sashes and rafters* of the best Memel timber; or when the houses are exposed to powerful heat, and excessive wet, the rafters and sash-bars will warp, and the roof be spoiled.

5. Never, except in houses of peculiar construction, form the roof of *metal,* for although it looks very light and ornamental, yet in the first place, the expence is nearly threefold; secondly metal, is so liable to corrode, that it is less durable than wood; thirdly, many plants suffer under metal, from excessive heat during summer, and excessive cold during winter; and fourthly, from expansion and contraction, the glass is more often broken than with wood.

6. *The dimensions* of the house on the plan, are as follows:—*length* 31 feet 6 inches, *breadth* 18 feet 6 inches, outside measure.

7. *The angle,* or inclination of the roof, is 60 degrees; that is, the back wall is 9 feet higher than the front one. The house on the plan is 12 feet high at the back, and three feet at the front.

8. *The rafters* are about four feet distant from centre to centre.

9. *One flue* merely passes once round the house, as shewn in the ground plan; and no walk is allowed in front; the flue passes under the walk, and is carried up the back wall to the chimney.

10. *The flue* is 18 inches wide, that is 9 inches wide and 12 inches deep in the smoke passage; and the walls 4½ inches thick, that is a brick flat.

11. *The walk* is 3 feet wide, and the floor of it is composed of bars of wood, 4 inches broad and 2 inches thick, nailed to sleepers, laid lengthways.

12. *The fire place* is sunk below the level of the floor several steps, to allow a sufficient rise from the fire to give a good draught.

13. A cavity, 2 inches wide, is left on each side of the front flue, that the heat may freely escape.

14. A space, about 1 foot wide, is allowed betwixt the walk and the back wall, for placing vines or other fruit trees in pots or tubs, where the branches may be trained to the wall.

15. A winter chamber, a foot and half wide, is left betwixt the front wall and the front cavity, in which the vines can be laid

during their season of torpidity, and a free current of the outer air is admitted to them through ventilators in the front wall, and all communication with the chamber and the house cut off by a board being placed on the chamber wall.

The dimensions, then, are as follow :—

	Ft.	*In.*
Front wall, (*a*) 3 feet high,	0	9 inches thick.
Winter chamber, (*b*)	1	6 wide.
Chamber wall (*a*).....	0	4½ thick.
Cavity, (*d*)	0	2 wide.
Flue front, (*e*).....	1	6 wide.
Cavity, (*f*)	0	2 wide.
Pit wall, (*g*)	0	4½ thick.
Bark pit, (*h*)	6	0 wide, 3 ft. 6 in. deep.
Back flue, (*i*)	1	6 wide, 3 ft. high.
Walk, (*j*).....	3	0 wide.
Back space, (*k*)	1	0 wide.
Back wall, (*l*)	1	6
Two end walls	0	9 4½ in. thick, each.

16. The ventilators (*n*) in front wall 15 inches long, and 6 inches broad ; one to be made betwixt each rafter.

17. The shed (*m*) is 10 feet wide, and the wall which supports the lean-to roof 8 feet high.

18. Common pine timber will answer very well for the roof of the *shed*.

19. *Two windows* are inserted in the shed wall, and the door to open at one end.

20. *Sashes*.—The upper lights of the roof are 8 feet 6 inches long, by 3 feet 4 inches broad, and the lower lights 10 feet by 3 feet 6 inches broad.

21. The *glass* to be the best crown, and the dimensions about 6 by 3 inches.

22. The quantity of glass required for each of the upper lights, allowing for overlaps, is about 34 square feet, or for the whole 8 upper lights 272 square feet.

The quantity of glass required for one of the lower lights is about 40 feet, or for the 8 lower lights 320 feet square.

The two end angles and doors will require about 90 square feet to complete them.

The two shed windows will take about 22 square feet of glass; making the cost of erecting the house and shed about as follows :—

	Feet.			
Glass, 6×3 Upper lights ...	272			
..... Lower lights ...	320			
..... End angles	90			
..... Shed windows .	22			
Making in the whole...	704 feet, at 8½d. per foot,	£24	18	8
Bricks for the flues.....	1000			
..... for the house walls	1750			
..... for the back shed ...	1000			
Making in the whole	3750 bricks, at 10s. per 1000,	2	0	0
Wood, and joiners' work included :—				
700 feet, at 1s. per foot		35	0	0
Fire place, grate, &c.		1	10	0
Slates for back shed, including slating		2	10	0
Glazing and painting		5	0	0
Masonry, including carting, &c. &c.		15	0	0
		£75	18	8

In some situations the expense of erection might be something less than here named, but the above we think about a fair calculation.

HOTHOUSE,—*No.* 2, *Plate* 6.

This is another cheap, plain, and useful house, in which plants may be seen to great advantage. The upper lights slide as in No. 1. plate 5, but no walk is required at the back, for the purpose of giving air, as the back flue is sufficient to stand upon for that purpose.

The flue enters at the back, passes round the front of the house, and returns against the back wall. On the front flue a stage is erected, either a little above it, and made something broader, or it may be merely a trellis laid on the flue top, to prevent the roots of the plants suffering from the heat.

The front sashes swing open on pivots, fixed at the top of the side styles, in preference to sliding, which exposes the plants too much when air is given. The sashes are fastened open by small pieces of flat iron, pierced with a few holes, which fasten on pins fixed (one to each light) in the front wall plate.

Such a house may be made of any size that will suit the collection intended to be kept by the proprietor; but for the purpose of giving some idea of the cost, something definite must be fixed. So we will suppose the dimensions to be as follow :—

Length, (inside measure) 30 feet.

Breadth, (inside measure) 16 feet 6 inches.

The angle of the roof is 60 degrees, the back wall being 15 feet, and the front, including the front sashes, 6 feet.

The rafters are 4 feet distant from centre to centre.

The dimensions of the flue are the same as in No. 1, page 93, and the fire place is fixed in a similar manner.

The walk is in front 3 feet 6 inches wide, and may be made either with bars of wood, as No. 1, or laid with flags.

The floor on which the plants are placed may either be flagged, or prepared as follows :—First, lay about 4 inches thick of lime siftings, on this 2 inches or more of sifted ashes, and, lastly, some fine sifted sharp sand, on which the plants may stand. No worms will penetrate through this; and the sand, if now and then loosened up to prevent the growth of moss, will always look neat.

The description and dimensions are as follow :—

Front wall, (*a*) 4 feet high, 9 inches thick.

Front sashes, (*b*) 4 feet deep.

Front flue, (*c*) 1 foot 6 inches wide, with a cavity of 2 inches next the wall.

Front stage for small pots, (*d*).

Walk, (*e*) 3 feet 6 inches wide.

Back flue, (*f*) 1 foot 6 inches wide, with a cavity of 2 inches next the wall.

Back wall, (*g*) 1 foot 6 inches thick.

The general expense of the erection of such a house would be as follows :—

	£.	*s.*	*d.*
Glass, 1000 feet, at 8½d. per square foot	35	8	4
Bricks, 3500, at 10s. per 1000	1	15	0
Joiners' work and wood.....	50	0	0
Masonry, carting, &c.	20	0	0
Glazing and painting	6	0	0
Fire place, and other incidentals	2	0	0
Making the whole cost about.....	£115	3	4

HOTHOUSE,—*No.* 3, *Plate* 6.

The erection of this house would be far more expensive than either of the two former; it would, however, have a very handsome appearance, and the plants would prosper in it well; also not being a lean to, it might be placed in a situation which could not be allowed to either of the others.

The direction of the house is north and south, the two fronts facing east and west, which might be ornamented to suit any kind of architecture.

The side walls (b) are four feet high, and eighteen inches thick, and on the top of these side walls are fixed sashes, *(d)* four feet square, swinging open on pivots, after the same manner as No. 2.

From the top of the front and back sashes, springs the span roof, *(c)* supported, where it meets in the centre, by pillars four feet apart the whole length of the house.

The perpendicular height from the floor to the crown of the angle, *(e)* is sixteen feet.

The width of the house from wall to wall, inside measure, is twenty feet.

A fire place is made at one end, and the flue passes round the house, as marked on the section.

The rules for building the flue are the same as given for No. 1.

Over the flue, all round, a flat stage is erected, four feet high, for placing plants in pots too small to stand on the floor.

The walk *(a)* is four feet wide, and goes allround the house; and doors may be placed at each end, or the middle as most convenient.

Down the centre of the house all the large plants are ranged, from one end of the house to the other.

The roof should be made fast, or in strong storms (if it stands in an exposed situation) it would not be secure.

As the erection of every kind of Horticultural building belongs more particularly to the volume on the Principles of Gardening, which will appear shortly, it is needless to say any more on Plant Stoves at this time; and shall therefore conclude these remarks, by—

A FEW OBSERVATION ON FORCING

Several species of hardy flowers, as Roses, Lilacs, Kalmias, Rhododendrons, &c. for the sake of their flowers in winter.

Although hardy plants will come under our notice bye and bye, yet the introduction of them into our stoves, for the sake of enlivening the conservatory and drawing rooms during the dreary months of winter, merits attention in this place, before we enter on the subject of Greenhouse and Conservatory Plants.

And, first, the kinds usually potted for this purpose are as follow:—

Andromeda racemosa.
..... speciosa.
Azalea calendulacea.
.... ignescens.
.... splendens.
..... nudiflora.

Azalea nudiflora alba.
.... incarnata.
.... thyrsiflora.
..... pontica.
.... albiflora.
.... tricolor
Caprifolium sempervirens.
.... minus.
..... Periclymenum serotinum.
Daphne mezereum.
.... alba.
..... cneorum.
Pæonia Moutan.
.... Banksia.
.... papaveracea.
Kalmia latifolia.
Ledum latifolium.
Rhodora canadensis.
Rhododendrum ponticum.
.... rosea.
..... maximum.
..... catawbiense.
..... dauricum atrovirens.
..... Alta Clerense.
Rosa muscosa, all the varieties.
..... provincialis, and several other varieties.
Syringa persica.
.... alba.

The above, together with Pinks, Carnations, Wallflowers, and several bulbous plants, form the chief of what are brought in for winter flowering.

POTTING FOR FORCING.

In March take up some good plants with balls, of the various species of Andromeda, Azalea, Caprifolium, Daphne, Kalmia, Ledum, Rosa, and Pæonia. Pot the Andromedas, Azaleas,

Kalmias, and Ledums in sandy heath mould, and the rest in rich light loam, with some very rotten dung.

The roses will require to be pruned as soon as they are planted. Cut every young shoot back to two or three eyes, according to its strength, and if properly treated during the succeeding summer, they will make fine shoots for forcing.

When the above plants are potted, plunge them up to the rim in a warm sheltered border, and place a little rotted dung over the whole surface where the plants are plunged; this will keep them moist at the roots, and greatly nourish them during the succeeding summer.

In September pot off a quantity of Pinks, Carnations, Wall-flowers, &c. in light rich mould, composed of one-half loam from a pasture, and one-half leaf mould; mix well, and sift them together through a coarse sieve. And when potted, plunge them on a south border; but as the season of heat is nearly past, it is unnecessary to mulct them with dung as the last.

In October select a sufficient number of Rhododendrons, well filled with flower buds; take them up with good balls, as recommended before, and pot them in equal parts of rich strong loam and sandy heath mould, and plunge them also in a south border.

In December prepare for bringing them into the stove. Take up the pots, and top dress with good rich soil; then wash the pots clean, prune off every decayed shoot, and place them in the most airy and cool part of the stove, for if the heat be too strong at the commencement, the buds will break weakly, and the flowers in consequence be small and inferior. As the buds expand, give them more heat, and allow no deficiency of water.

Syringing.—After the buds have begun to expand, syringe them with clear water every day; and should the Aphis infest them, which is probable, treat them as recommended, page 4, for the Aphis vitis.

GENERAL MANAGEMENT

OF THE

GREENHOUSE, CONSERVATORY, AND GLASS CASE.

Greenhouse and Conservatory Plants, with a few exceptions, are all natives of countries neither subjected to great heat nor excessive cold; and wherever found within the tropics, they occupy mountains and other situations, where the natural temperature is greatly diminished.

Frame Plants, or such as occupy the glass case, are still more hardy, but will scarcely endure the rigour of our winters.

Plants from temperate climates, which require shelter under glass, divide themselves into 3 kinds.

1. Those whose wood is soft and fleshy, the leaves tender, and will scarcely endure any frost without injury, as Erica, Pelargonium, &c. &c. strictly called "GREENHOUSE PLANTS."

2. Such as have a hard woody habit, with dry, and in many cases, shining leaves, as Orange, Fuchsia, Camellia, &c. denominated "CONSERVATORY PLANTS."

3. Such as will endure a portion of frost without injury, but will not bear full exposure to the storms of winter, called "FRAME PLANTS."

The whole of these kinds flourish in a common greenhouse.

All Greenhouse Plants, like those of the Stove, page 43, require a season of excitement and growth, when a little heat and plenty of water is required; and a season of torpidity and rest, when they should be kept very cool, and partially dry.

Both Greenhouse and Conservatory Plants requiring the same general management, it is unnecessary to treat on the two kinds separately.

1st.—GROWING SEASON,

Continuing from February to November.

Temperature.—Greenhouse Plants, with a few exceptions, never require more heat than will keep the house free from frost, as heat invariably renders them weakly, and prevents their flowering freely.

Air.—Always let it be borne in mind, that the more air is admitted into a greenhouse, (if not frosty,) the more healthy and vigorous will the plants grow. Therefore, as early as possible every fine morning, throw open the sashes, to allow a free ventilation; but whenever there is a prospect of a cold night, close up in good time in the afternoon.

As spring advances, and the weather becomes mild, leave some air on all night, to harden the plants previous to their being set out of doors: a small portion must be given at first, and increased as the weather will allow.

Dampness.—In case of the weather being excessively wet and stormy, so that a free ventilation cannot be allowed, it will be necessary always to make a little fire to dry up the dampness, or the plants are liable, early in the season, to lose their flower buds. In no case continue the heat beyond the end being answered by it.

Watering.—If the weather is wet and frosty, which is commonly the case early and late in the season, be very sparing in the supply of water; look over the plants every day, and where the soil is evidently dry, let a little be given without wetting the leaves.

From February to May, and during the month of October, the best time for watering is from nine to twelve o'clock in the morning; but, during the whole of the summer months, late in the evening is preferable,—but any plants disposed to flag, must be supplied at all times of the day when requisite.

Syringing.—After the middle of March, if the weather be fine, syringe the plants with clear water about once a week, this will keep the leaves clean, and greatly facilitate the throwing up of their flower stems, but caution is required, for if done when there is no sunshine, the injury sustained by over moisture to some of the more delicate kinds, will be greater than the benefit.

Plate 8

Punica Granatum Flavum

Always after syringing, shut up the house for an hour, and give the plants a "*sweat.*"

Top dressing.—At all seasons, whenever moss is observed to grow on the soil in the pots, or if the soil is evidently exhausted, let it be well stirred up, a little taken off, and a new supply added; but be careful to put the proper kind to each plant.

Soil.—Although general rules for mixing and forming soils to suit the various Genera of Plants may be given with advantage, yet the diversified habits of each render several deviations from these rules necessary.

The following, with a few exceptions, will not be far from correct.

1. Plants with fine fibrous roots, and slender branches, with the general habits of Ericeæ, should be potted in heath-mould: such are Erica, Diosma, Brunia, Boronia, Barosma, Azalea indica, and varieties, Epacris, Adenandra, &c. &c. &c.

2. Plants whose wood and habits only partially differ from the last, but have more robust roots, as Acacia, Adenandra, Araucaria, Arduina, Brachysema, &c. &c. These should be potted in a mixture of one-half heath mould, one-fourth sandy loam, and one-fourth leaf mould, all well beaten together.

3. Plants with their roots and general habits stronger than the last, as Ardisia, Bursaria, Callistemon, Calothamnus, Pelargonium, &c. &c. thrive best in one-half very sandy loam, one-fourth heath-mould, and one fourth leaf mould, or very rotten dung.

4. Shrubs with luxurious roots and slender heads, as Senecio, Coronilla, Veronica, Cineraria, &c. &c. require to be potted in equal parts of light sandy loam, leaf mould, and very rotten dung.

5. Strong growing shrubs with luxuriant roots, as Clethra, Aurantia, Edwardsia, &c. &c. require a good rich loam, lightened with leaf mould, and very rotten dung.

6. Perennials of strong or slender growth, should be potted in the same soil as shrubs of similar habits.

7. Cape, and other greenhouse bulbs, thrive in one half-light rich loam, one-fourth leaf mould, and one-fourth heath mould.

8. Half-succulent plants require a poor loam; for if potted in any thing rich, they grow too luxuriant, and seldom flower.

9. Succulents always flower best if a portion of lime rubbish be mixed through the soil in which they are potted.

It is never advisable to sift the soil through too fine a sieve, for if this be done, the fibrous particles are separated, and the soil in consequence is liable to bake hard in the pots, which prevents the roots growing freely. It is preferable for all strong growing plants, to break it fine, and not sift it at all.

Potting.—Make it a rule never to allow any plant to become stunted for want of room in the pot; but as general potting seasons,—the end of February and beginning of September,—are the best times, re-pot at these times all that appear likely to require it soon, and top-dress the remainder.

In potting never neglect to give a good drainage; many valuable plants are lost for the want of this precaution, for if ever the water stagnates the roots soon perish.

It is always injurious to pot in wet soil, it is preferable to have it rather dry than otherwise, for when wet if it be pressed close about the plants it becomes sodden, and if not pressed its looseness prevents the free growth of the roots.

Setting out of doors.—About the end of May the plants may be removed to their summer station, out of doors. Place them in an aspect sheltered from the scorching rays of the sun, but where they will receive it morning and evening.

If it can be done, remove them in calm, cloudy weather, for if removed in bright sunshine, the exposure dries the soil too much, and before the plants can be fixed in their situation they often materially suffer.

Whilst standing out of doors supply them well with water, and re-pot as often as requisite, for if the roots become too cramped, the sun is liable, by heating the pots, to damage the small fibres.

Early in September re-pot and otherwise regulate by tying up, and generally cleaning them previous to bringing into the houses again, which should never be allowed to be later than the first week in October.

Housing.—After their removal into the house again, give abundance of air night and day, as long as it can be safely allowed; as the winter advances close up at night, lest a frosty night destroy the whole.

2nd.—SEASON OF TORPIDITY,

Continuing from November to February.

The only difference in treatment betwixt the season of growth and that of torpidity, is, that in the latter much less water at the roots is required, and sprinkling water over the leaves must be entirely dispensed with.

Fire is never requisite except to dry up excessive dampness, and prevent injury by frost; if carried beyond this in winter it becomes injurious.

If possible, admit a free circulation of air every day.

Be particularly careful to keep the plants clean and free from dead leaves, as, if these are allowed to hang on and rot, much injury will be done by them.

Always water in the mornings, betwixt 9 and 12 o'Clock, that the dampness may have time to dry up before night.

Never water any plant unless the soil in the pot is evidently dry, and be careful to keep all the leaves dry.

MANAGEMENT OF THE GLASS CASE, OR FRAME.

The Glass Case, or Frame, is never artificially heated; but in case of severe frost, may be securely covered with mats. If convenient, a good situation for the frame is to place it against the front wall of a greenhouse, or stove, as some advantage is derived from the flues of the house; but if this cannot be done, a border facing the south, or even the east or west, sheltered by a hedge, paling, or wall, will answer very well.

Frame Plants are exotics, hardier than those kept in the greenhouse.

The only time these plants require the shelter of glass, is in winter; during the summer they usually occupy beds in the flower

garden, or are placed in such situations in the borders as their habits require.

The plants should be grown in pots, for the facility of removal when necessary, and the pots are kept in better condition if plunged in a bed of sand, saw-dust, or any similar material.

Air.—Never neglect to give abundance of air every fine day, or during the dark months of November and February many of the more delicate species will damp off

Watering.—The less water is given in winter the better. Never administer it at all, unless on fine days, and when the soil is evidently dry.

The propagation and general management is, in every respect, like the rules given for greenhouse plants.

INSECTS AND DISEASES INCIDENT TO GREENHOUSE PLANTS.

Greenhouse, like Stove Plants, are subject to the attacks of many insects, as the Brown Scale (Coccus hesperidum), Aphis various species, Red Spider (Acarus telarius), Thrips (Thrips physapus), Woodlouse (Oniscus asellus), Chermes (Psylla), Slug, Earwig (Forficula auriculare), and a brown long snouted weevil.

The Brown Scale is figured plate 1, fig. 4. *c d e f*, and described page 3.—Aphis vitis, which attacks the Camellia, plate 1, fig. 3, and page 4.—Aphis Cactæ and Cassiæ, plate 4, fig. 5, and described page 58.—Aphis Geraniæ, plate 8.—Red Spider, plate 2, fig. 2, and page 60.—Thrips, plate 1, fig. 1, and page 1.—Woodlouse, plate 3, figs. 1, 2, and 3, and page 62.—Chermes, plate 1, fig. 2, and page 2.—The Slug, plate 8, fig. 1.—The Earwig, plate 14, and the small Brown Beetle, plate 9, figs. 1, 2.

APHIS GERANIÆ.

GERANIUM FLY,—*Plate* 8, *Fig.* 2.

ORDER, *Homoptera.* DIVISION, *Aphidæ.*

This kind of Aphis in general confines its depredations to the various species of Pelargonium, Geranium, and other similar

plants; the general habits and modes of destruction are the same as described in pages 4 and 58. As the Earwig and Weevil attack several species of hardy plants, and commit much greater depredations in the open garden than under glass, they will be treated on at large under that head.

PROPAGATION OF GREENHOUSE AND FRAME SHRUBS.

In the propagation of Greenhouse and Frame Shrubs, the same remarks are applicable as for Stove Plants, which see page 13.

Where there is any peculiarity in the treatment of the following Genera, the culture and propagation will be treated on at large hereafter; these are marked thus, (*a*).

I.—Selection of Genera, the cuttings of which require to be planted in pots of fine sand, and covered with a glass :—

1.—To be Plunged in Heat.

a Ripened Cuttings.

Adina,
Berchemia,
Bumalda,
Callicoma,
Callistemon,
Camellia,
Cargillia,
Cassine,
Celastrus,
Ceratonia,
Cryptandra,
Cunnonia,
a Curtisia
a Daphne,
Derris,
Diospyros,
Discaria,
a Drimys,
Elæocarpus,
Elæodendron,
Escallonia,
Euclea,
Eugenia,
Euonymus,
Eustegia,
Exocarpus,
Friesia,
Gordonia,
Grewia,
Halleria,
Hartogia,
Heimia,
Hovenia,
Illicium,
Kiggelaria,
Larrea,
Lasiopetalum,
Laurophyllus,
a Laurus,
Leptomeria,
Logania,
Lycium,

Maclura,
Magnolia,
Mauria,
Maytenus,
Melaleuca,
Melia,
Mespilus,
a Metrosideros,
Mylocarium,
Nandina,
Niebuhria,
Notelæa,
Ocotea,
Olea,
Osyris,
Photinia,
Phyllocladus,
Pistacia,
Pittosporum,
Plectronia,
Plocama,
Podocarpus,
Polyspora,
Porliera,
Punica,
Raphiolepis,
Reevesia,
Rhamnus.
Royena,
Rhus,
Sarcococca,
Schinus,
Schizandra,
Schæpfia,
Schotia,
Senacia,
Sersalisia,
Sideroxylon,
Sophora,
Sterculia,
Symplocas,
Tasmannia,
Viburnum,
Visnea,
Vitex,
Zizyphus.

b Half-Ripened Cuttings.

Anagyris,
Anopterus,
Anthocercis,
Adamia,
Anthospermum,
Ardisia,
Arduina,
Aralea,
Baccharis,
Beaufortia,
Berberis,
Billardiera,
Berardia,
Brachylæna,
Berzelia,
Brachysema,
Bumelia,
Blackwellia,
Bolivaria,
Borbonia,
Castanospermum,
Callistachys,
Campamanesia,
Capraria,
Carpodontus,
Cassia,
Casuarina,
Ceratopetalum,
Cestrum,
Chamælaucium,
Clethra,
Colliquaja,
Coleonema,
Conospermum,
Craspedia,
Cupania,
Derwinia,
Dicera,
Ekebergia,
Empleurum,
Eucalyptus,
Fagonia,
Ficus,
Gomphocarpus,
Gryrostemon,
Hymenanthera,
Loureira,
Lyonsia,
Lightfootia,
Marsdenia,
Macrostylis,
Meticytus,
Mentzelia,
Myoporum,
Myrsine,
Myrtus,
Monina,
Olinia,
Oxleya,
Petrophylla,

Pinckneya,
Plalylobium,
Pomaderris,
Pteronia,
Pultenæa,
Raspalia,
Retzia,
Rhagodia,
Rhus,
Sollya,
Spartothamnus,
Sphacele,
Sparmannia,
Soulangia,
Spermaxyrum,
Stenochilus,
Simsia,
Swainsonia,
Thamnea,
Thesium,
Tristania,
Trevoa,
Thomasia,
Zygophyllum,
Willemetia,

c Cuttings of the Young Wood.

Adenocarpus,
Adesmia,
a Aitonia,
Alysicarpus,
Astartea,
Azalea,
Bæckia,
Befaria,
Bursaria,
Burtonia,
Calytrix,
Candollea,
Carmichælia,
Chimonanthus,
Chorizema,
Chrysochoma,
Cliffortia,
Condalia,
Coursetia,
Cupressus,
Darlingtonia
a Dichilus,
Dorycnium,
Euchætis,
Euchilus,
Eutaxia,
Fabricia,
Fagelia,
Gastrolobium,
Genetyllis,
Genista,
Glycine,
a Gnidia,
a Gompholobium,
Goodenia,
Goodia,
Hoffmanseggia,
Hudsonia,
Hypericum,
Hypocalyptus,
Indigofera,
Ipomæa,
Jacksonia,
Jonidium,
Kennedya,
Lachnæa,
Lebeckia,
Leptospermum,
Lespedesia,
Lassertia,
Loddigesia,
Luculia,
Lobelia,
Microdon,
Mirbelia,
Mundia,
Muraltia,
Myrica,
Nebelia,
Otoptera,
Oxylobium,
Passerina,
Penæa,
Phebalium,
Philotheca,
Phylica,
Phyllolobium,
Pileanthus,
Pimelea,
Plagianthus,
Plagiolobium,
Pleurandra,
Podalyria,
Podolobium,
Polygala,
Poranthera,
a Priestleya,
Psoralea,

Rafnia,
Reaumeria,
Requienia,
Roella,
Rœperia,
Retanilla,
Rhododendron,
Rhynchosia,
Sarcophyllum,
Schrankia,
Scottia,
Sclerothamnus,
Silene,
Soulangia,
Sphærolobium,
Staavia,
Stackhousea,
Stenospermum,
Stobæa,
Tecoma,
Templetonia,
Tephrosia,
Tephrothamnus,
Thomasia,
Tittmannia,
Tricocephalus,
Trochocarpa,
Vaccineum,
Vascoa,
Verbena,
Verticordia,
Viborgia,
Viminaria,
Virgilia,
Westringia,
Wiborgia,
Willemetia,
Zieria.

2.—To be Planted in Sand, and not Plunged in Heat.

a Ripened Cuttings.

a Acmena,
a Agastachys,
a Anadenia,
a Aulax,
a Banksia,
Barosma,
a Belis,
Bosea,
Botrycerus,
Brabejum,
a Calodendron,
Cryptocarya,
Dacridium,
a Dryandra,
a Enkianthus,
Flindersia,
a Grevillea,
a Hakea,
a Isopogon,
Lambertia,
a Leucadendron,
Leucospermum,
Lomatia,
a Mimetes,
a Nivenia,
Persoonia,
Petrophilus,
a Pinus,
Ponceletia,
a Protea,
a Serruria,
Sorocephalus,
Spattalla,
Stenocarpus,
Telopea,
Xylomelum.

b Half-Ripened Cuttings.

a Amygdalus,
Andromeda,
a Angophora,
Astrotriche,
Athanasia,
a Boronia,
a Bossiæa,
Callitris,
a Calothamnus,
a Crowea,
a Dalea,
a Daviesia,
Echites,
Lysinema,
Sphenotoma,
Sprengelia,

c Cuttings of the Young Wood.

a Achyronia,
Acmadenia,
Acrotriche,
Adenandra,
Agathosma,
a Agonis,
Andersonia,
a Anthyllis,
Aotus,
Aphalexis,
a Araucaria,
Ascyrum,
a Aspalathus,
a Astroloma,
Audouinia,
Blæria,
Borbonia,
Brunia,
Cluytia,
a Cyathodes,
Cyclopia,
a Cyrilla,
Cytisus,
Diosma,
Drachophyllum,
Edwardsia,
a Epacris,
a Erica,
Eriostemon,
Hovea,
Leucopogon,
Linconia,
a Liparia,
Lissanthe,
Melichrus,
Monotoca,
Struthiola,
Simsia,
Stenanthera,
Styphelea,
Sympieza.

II.—Selection of Genera, the Cuttings of which require to be planted in pots of soil, and covered with a glass :—

1.—To be Plunged in Heat.

a Ripened Cuttings.

Cryptana,
Lonicera,

b Half-Ripened Cuttings.

Acæna,
a Alonsoa,
Amellus,
a Anagallis,
Aristolochia,
Asclepias,
Bouvardia,
a Brugmansia,
Buddlea,
Bupleurum,
Callicarpa,
Camphorosma,
Cissampelos,
Cistus,
Clematis,
Cobæa,
a Coronilla,
Crucianella,
Cryptospermum,
Cullumia,
Cussonia,
Dolichos,
Eriocephalus,
Gazania,
Gelsemium,
Helianthemum,
Hermannia,
Hibbertia,
Hibiscus,
Hippia,
Hippocrepis,
Jasminum,
a Linum,
Melianthus,
Menispermum,
Œdera,

Panax,
a Pelargonium,
Pentataxis,
Pharnaceum,
Piqueria,
Plumbago,
Prostanthera,
Ruellia,
Salvia,
Selago,
Selloa.

c Cuttings of Young Wood.

Aloysia,
Astranthus,
Bauera,
Bignonia,
Bœhmeria,
a Bouvardia,
Brogniartia,
Coris,
Calampelis,
Castilleja,
a Charlwoodia,
Chenolea,
a Chironia,
Chloanthus,
Chryanthemum,
Chuquirago,
Ciconium,
Cineraria,
Crotalaria,
Dampiera,
Diomedea,
Disemma,
Dracocephalum,
Dolichos,
Eccremocarpus,
Entelea,
Erinus,
Eriocoma,
Farsetia,
Fieldia,
Frankenia,
Fuchsia,
Galenia,
Grindelia,
Haloragis,
Hebenstretia,
Heliotropium,
Herniaria
Heteromorpha,
Hoitza,
Hypoestes,
Iberis,
Ixodia,
a Jenkinsonia,
Knoxia,
Lechenaultia,
Leonotis,
Lippia,
Lophospermum,
Lotus,
Mahernia,
Manulea,
Maurandya,
Mikania,
Mutisia,
Omalanthus,
Ozothamnus,
Parochetus,
Passiflora,
Peraltia,
Phymatanthus,
Podanthus,
Polycarpæa,
Poterium,
Rulingea,
Stæhelina.

2.—To be Planted in Soil, and not Plunged in Heat.

a Ripened Cuttings.

Corræa,
Helichrysum.

b Half-Ripened Cuttings.

a Astelma,	Disandra,	*a* Pœonia,
a Calceolaria,	Gnaphalium,	Rosa,
Campylia,	Grielum,	Rubus
Coriaria,	Hoya,	Salvia,
Cobæa,	Hydrangea,	Sphænogyne.
Chieranthus,	Limeum,	

c Cuttings of the Young Wood.

Arctotis,	Coris,	Seringia,
Altenanthera,	Cosmelia,	Spielmannia,
Brandesia,	Leucostemma,	Spigelia.
Cassinia,	Senecio,	

III.—Succulents, the Cuttings of which, after separation from the parent plants, require to be more or less dried previous to planting, and neither to be covered with a glass, plunged, or placed in a moist heat.

To be Planted in Pots of Soil.

Aizoon,	Curtogyne,	Portulacaria,
a Anacampseros,	Echeveria,	Purgosea,
Apicra,	*a* Furcræa,	Rhipidendron,
Bowiea,	Globulea,	Rochea,
Ceropegia,	Kalanchoe,	Sempervivum,
Cotyledon,	Mesembrianthemum,	Tetragonia.
Crassula,	Pachidendron,	

IV.—Plants increased by Cutting of the Roots.

Dais.

PROPAGATION OF GREENHOUSE AND FRAME PERENNIALS.

The remarks given in page 22, on the Propagation of Stove Perennials, are equally applicable to those of the Greenhouse, with the exception of heat.

All Perennial species, propagated by other means than Cuttings, require no more artificial excitement than is usually supplied to Greenhouse and Frame Plants.

Cuttings of Greenhouse Perennials require the same treatment as those of the Stove, page 23.

I.—List of Genera, the Species of which are increased by dividing the Roots :—

Astephanus,	Calceolaria,	Mitrasacme,
Agapanthus,	*a* Calla,	Monsonia,
Anthericum,	Commelina,	Patersonia,
Arthropodium,	Coburghia,	Pinguicula,
Arctotis,	Cineraria,	Renealmia,
Anigosanthus,	Conostylis,	Schelhammera,
Asclepias,	Dichondra,	Schænus,
Bobartia,	Grielum,	Sisyrinchium,
Bulbine,	Hæmodorum,	Wachendorfia.

II.—Genera, the Species of which are increased by Offsets :—

Ammocharis,	Calostemma,	Eucomis,
Anomatheca,	Chrysiphiala,	Eriospermum,
Antholyza,	Cyrtanthus,	Ferraria,
Anisanthus,	Cypella,	Galaxia,
a Albuca,	Cummingia,	Gethyllis,
Amaryllis,	Cyanella,	Gastronema,
Babiana,	Clivea,	Geissorhiza,
Brodiæa,	Calochortus,	Gladiolus,
Brunsvigia,	Cyclobothra,	Hæmanthus,
Chlidanthus,	Drimia,	Habranthus,

Hypoxis,	Nerine,	Strumaria,
Homeria,	Ornithogalum,	Tritelia,
Herbertia,	Orthrosanthes,	Tigridia,
Hesperantha,	Oxalis,	Triconema,
Ixia,	Polianthes,	Tritonia,
Lapeyrousia,	Phycella,	Tulbaghia,
Leucocoryne,	Petamenes,	Vallota,
Lachenalia,	Sparaxis,	Vieusseuxia,
Massonia,	Synottia,	Watsonia,
Melasphærula,	Streptanthera,	Zephyranthus.
Moræa,	Spatalanthus,	

III.—Genera, the Species of which throw up Suckers, by which they are propagated :—

Gasteria,	Haworthia,	Dianella.

IV.—Species propagated by Cuttings :—

a Half-Ripened Cuttings.

Escallonia,	Lychnis,	Witsenia.
Kuhnia,		

b Young Wood.

Ambrosia,	Dampiera,	Turgosia.
Cineraria,	Lobelia,	

V.—Genera increased for the most part by Seeds :—

Aristea,	Cyclamen,	Lacnanthus,
Argemone,	Danthonia,	Opercularia,
Anemone,	Dilatris,	Pedicularis,
Actinotus,	Goodenovia,	Seymouria,
Blandfordia,	Hunnemannia,	Vescicaria.

SELECT LIST OF CONSERVATORY AND GREENHOUSE PLANTS.

Arduina bispinosa, white, March, a pretty species.

Araucaria imbricata,
..... braziliense,
Altingia excelsa,
.....Cunninghamia,
} These are all very handsome Plants, nearly hardy.

Acacia lophantha, and many other species.
Azalea indica alba, white, March.
.... Danielsiana, scarlet, April.
.... variegata, red and white, April.
.... phœnicea, purple, March.
.... Smithii, purple, March.
.... coccinea, scarlet, April.
.... ignescens, crimson, March.
.... aurantiaca, orange, March.
Astelma eximium, crimson, July.
..... speciosia, white, June.
Ardisia thyrsiflora, rose, May.
..... excelsa, rose, June.
Adesmia microphylla, yellow, May.
Banksia Cunninghamii, and most other species.
Bouvardia triphylla, scarlet, April.
Beaufortia decussata, scarlet, March.
..... carinata, scarlet, March.
..... sparsa, scarlet, March.
..... splendens, scarlet, April.
..... Dampieri.
Bauera rubioides, purple, May.
Boronia serrulata, rose.
Barosma pulchella, purple, February.
Brugmansia, suaveolens, white, May.
..... sanguinea, red, May.
Bumelia strigosa, white, June.
Burtonia scabra, yellow, May.

Burtonia conferta, purple, April.
Bursaria spinosa, white, August.
Berberis, all the species are well deserving culture.
Camellia, all the species and varieties, see page 1.
Chironia jasminoides, purple, April.
..... linioides, purple, June.
..... trinerva, purple, July.
Calodendron capense, rose, April.
Combretum grandiflorum, scarlet, February.
Clethra arborea, white, August.
Citrus, all the kinds.
Calothamnus quadrifida, scarlet, July.
..... villosa.
Cineraria cruenta, purple, February.
..... elegans, white, March.
Chorizema Henchmanni, crimson and orange, April.
..... spartioides, orange and crimson, April.
..... illicifolium, orange and crimson, April.
Callistemon saligne, yellow, May.
..... lanceolata, scarlet, June.
Corræa speciosa, red and green, April.
..... pulchella, scarlet and green, April.
Coronilla glauca, yellow, May.
.... varieagata, yellow, May.
Calceolaria bicolor, yellow and white, July.
..... arachnoidea refulgens, red, June.
..... integrifolia viscossissima, yellow, July.
..... chiloensis, yellow, August.
Ceanothus azuerus, blue, June.
Dryandra, any of the species.
Diosma ericoides, white, March.
Drimys wintera, rather tender, but will endure the Greenhouse.
Daphne odorata, white, May.
Dillwynia floribunda, yellow, April.
Erythrina caffra, scarlet, June.
..... laurifolia, scarlet, June.
..... crista-galli, scarlet, June.
Epacris grandiflora, crimson, May.

Epacris depressa, rose, May.
..... campanulata, rose, May.
..... ceræflora, white, March.
Erica, any of the species.
Eucalyptus piperita, white, all the species are handsome.
Escallonia rubra, red, March.
Eutaxia myrtifolia, orange, July.
Eriobotrya japonica, a Japan Fruit Tree; strong grower.
Edwardsia grandiflora, yellow, April.
..... chrysophylla, yellow, May.
..... chilensis, yellow, June.
Fuchsia fulgens, and all the other species and varieties.
Gardenia florida, white, July.
..... radicans, white, March.
Gompholobium venulosum, yellow, May.
..... grandiflorum.
Grevillea, all the species.
Gastrolobium retusum, orange, May.
Helichrysum proliferum, crimson, June.
Hovea Celsii.
..... chorizemifolia.
..... lanceolata.
Hakea, all the species.
Hovenia dulcis, white, July.
Kennedya, all the species are beautiful.
Lagestræmia indica, purple, July, rather tender.
Leucadendron argentea, yellow, May.
..... plumosum, yellow, June.
Luculia gratissima, red, August.
Leptospermum, all the species.
Lambertia, all the species.
Myrtus, any of the species.
Melaleuca, all the species.
Metrosideros, all the species.
Manulea rubra, red, April
..... tomentosa, yellow, May.
Muraltia heisteria, purple, June.
Nerium Oleander, rose, June.

Plate 9

Brown weevils. p. 208.

1 Azalea indica
2 Verbena Tweediana
3 Chorizema Henchmanni

Nerium splendens, rose, June.
Olea europea sativa, white, June.
Oxylobium retusum, orange, April.
Pimelea decussata, rose, August.
..... linifolia, white, March.
..... longiflora, white, May.
Pittosporum Tobira, white, March.
Pelargonium, all the kinds.
Protea speciosa, purple, March.
..... formosa, red, May.
..... coccinea, scarlet, March.
Punica Granatum, scarlet, May.
.... flore pleno, red, June.
.... albescens, white, June.
.... flore pleno, yellow white, June.
.... flavum, yellow, June.
..... nana, scarlet red, July.
Pultænea stricta, yellow orange, May.
Polygala cordifolia, purple, May.
..... speciosa, purple, May.
Pomaderris discolor, yellow or buff, June.
Rubus rosæfolius, white, April.
Rhododendrum arboreum, crimson, June.
.... album, white, June.
.... fimbriatum, white.
Roella ciliata, purple, June.
Stenanthera pinifolia, scarlet, May.
Styphelea tubiflora, crimson, May.
Struthiola erecta, white, July.
Salvia splendens, scarlet, July.
..... fulgens, scarlet, June.
..... patens, blue, May.
Telopea speciosissima, red, May.
Tournefortia heliotropoides, purple, May.
Tecoma Stans, yellow, August.
Tristania neriifolia, yellow, June.
Tephrosia grandiflora, rose, May.
Vaccineum myrtifolium, white, May.
..... meridionale, rose, May.

SELECTION OF GREENHOUSE CLIMBERS.

Bignonia capensis, orange, April.
..... cherii, deep orange, June.
..... jasminoides, rose, June.
..... grandiflora, orange, July.
Billardiera longiflora, crimson, May.
..... augustifolia, yellow, May.
Caprifolium oblongifolium, scarlet, May.
Clematis odorata, white, July.
..... massoniana, white and blue, May.
Cobæa scandens, purple, June.
Eccremocarpus scaber, scarlet, June.
Glycine argentea, yellow, July.
..... sinensis, blue, March and April.
..... heterophylla, yellow, July.
Jasminum odoratissimum, yellow, May.
Kennedya coccinea, and varieties, scarlet.
..... Marryatta, scarlet, June.
..... splendens, scarlet, September.
..... glabrata, scarlet, June.
..... Stirlingii, scarlet, April.
..... monophylla, purple, April.
..... prostrata, purple, April.
Lophospermum erubescens, rose, May.
Maurandya Barclayana, purple, June.
..... antirrhiniflora, rose, June.
..... semperflorens, rose, June.
Manettia glabra, scarlet, rather tender.
Mutisia latifolia, a scarce species at present.
Passiflora alato cærulea, rose, July.
..... edulis, white, May.
..... cærulea-racemosa, purple, June.
Podolobium scandens, yellow, May.
Rhodochiton volubile, dark purple, April.
Sollya heterophylla, blue, May.
Solanum crispum, blue, August.
Tacsonia pinnatistipula, rose, July.
Tropæolum tricolor, scarlet and yellow, July.
..... pentaphyllum, orange and red, July.

SELECTION OF CHOICE GREENHOUSE PERENNIALS.

Anomatheca cruenta, rich rose, July.
Alströmeria, any of the species.
Amaryllis, all the greenhouse species.
Anisanthus splendens, scarlet, May.
Anthericum glaucum, white, August.
Brunonia australis, rose, April.
Brunsvigia falcata, red, July.
Clivea nobilis, crimson red, August.
Coburghia incarnata, rose, August.
Calostemma alba, white, March.
Cyclamen persicum, white and red, March.
Calceolarias, all kinds.
Cyanella odoratissima, red, July.
Cyrtanthus collinus, red, July.
..... carneus, rose, August.
Cypella Herberti, red, April.
Cummingia trimaculata, blue, November.
Daubenya aurea, yellow, June.
Dianella strumaria, blue, March.
Doryanthes excelsa, buff, July.
Erodium serotinum, blue, July.
Gladiolus cardinalis, scarlet, May.
..... pudibundus, rose, May.
Gastronema pallida, white, May.
Hunnemannia fumariæfolia, yellow.
Ismene Amancaes, yellow, June.
Ixia conica, orange yellow, March.
..... viridiflora, green, March.
..... patens, purple, April.
..... curta, orange, April.
Lobelia erinus, blue, June.
..... Tupa, scarlet, June.
Lychnis grandiflora, orange, May.
Nerine Sarniensis, rose, September.
Oxalis Boweiana, purplish red, June.

Oxalis versicolor, yellow, red and white, March.
..... floribunda, rose coloured, May.
..... rosea, rose coloured, June.
Phycella ignea, scarlet, November.
Primula sinensis, rose, all the year.
.... alba, white, all the year.
Pancratium Amancaes, white, July.
Sprekelia formosissima, crimson, June.
Streptanthera cuprea, orange and purple, March.
Spigelia Marylandica, red, July.
Sparaxis tricolor, orange and red, June.
..... grandiflora, purple, June.
..... lineata, white and red, June.
Tropæolum minus flore-pleno, all the year.
Vallota purpurea, scarlet, May.
Witsenia corymbosa, blue, April.
Zephyranthus Atamasco, white, May.

SELECTION OF GREENHOUSE BIENNIALS.

Arctotis fastuosa, orange, } Both very handsome.
..... argentea, orange, }
Anagallis Monelli Willmoreana, blue purple.
..... latifolia, purple.
Cynoglossum pictum, blue, handsome.
Calceolarias, many kinds.
Galardia picta. This species is nearly hardy.
Humea elegans, red, not showy, but deserves culture.
Ipomopsis picta, red, } Both delicate growers.
..... elegans, red, }
Senecio elegans flora rubra, purple red.
.... alba, white.
Salpiglossis, many kinds are very handsome.
Verbena aubletia, purple, all summer.

SELECTION OF GREENHOUSE ANNUALS.

Leptosiphon densiflorus, pale purple.
Lessertia annua, red.
Loasa volubilis, yellow.
..... grandiflora, yellow.
Martynia longiflora, yellow.
Roella decurrens, blue.
Trachymene cærulea, blue.

SELECTION OF GREENHOUSE AQUATICS.

Heteranthera acuta, white.
Hydrolea spinosa, purple.
Jussieu grandiflora, yellow.
Nymphæa Lotus, rose. This species is tender, and must be placed in a warm place.
Nelumbium lutea, yellow.
Oryza sativa, or common rice.
Papyrus elegans, Egyptian paper plant.
Villarsia ovata, orange.
Zizania aquatica, Canada rice.

SELECTION OF GREENHOUSE ORCHIDEÆ.

Of the epiphytes very few species are sufficiently hardy to endure the Greenhouse, but a goodly number of terrestrial kinds are pretty hardy, requiring little more than shelter from excessive wet during the season of torpidity, and but a trifling excitement by heat during their season of growth.

Terrestrial Orchideæ.

Arethusa bulbosa, lilac.
Aceras secundiflora, violet.

Bletia, most of the species will thrive in a Greenhouse.
Calopogon pulchellus, purple.
Disa grandiflora, crimson.
..... bracteata, yellowish green.
..... graminifolia, blue.
..... cornuta, blue.
Diuris maculata, yellow.
..... aurea, yellow.
Lissochilus streptopetala, yellow.
Ophrys atrata, purple and white.
..... fusca, brown and yellow.
..... araenifera limbata, green and brown.
..... lutea, yellow.
..... tenthredinifera, rose and yellow.
..... speculum.
Pogonia ophioglossoides, rose.
Satyrium cucullatum, orange.
..... carneum, rose.
Cypripedium. All the species, except *insigne* and *venustum*, thrive well in the greenhouse.

PECULIARITIES IN THE CULTURE OF GREENHOUSE SHRUBS.

GENUS AITONIA.

The only peculiarity in the culture of this genus is, that the cuttings are liable to damp off; to prevent this, plant them thin in fine sand, cover them with a bell-glass, and wipe the glass every day.

GENUS ANGOPHORA.

The species of this genus are very scarce, and where they are found in collections they seldom flower until the plants arrive to a large size. To remedy this defect, cramp the roots in the pots, and

during the season of making wood place them in rather a higher temperature than greenhouse plants in general. The cuttings also strike very slowly, and are liable to damp off; plant them thin in pots of fine sand, cover them with a bell glass, and wipe off the dew from the glass every day.

GENUS ASTELMA.

This is a genus of plants usually termed "everlasting," their leaves and stems are soft and downy, and they are liable to perish in damp weather, unless they are properly treated.

Soil.—Equal parts of heath-mould and very sandy loam suit all the species best.

Watering.—At all times be careful not to wet the leaves, particularly in winter, as from their woolly nature they are so liable to rot.

Propagation.—Cuttings are rather hard to strike: the best way is to increase by seeds which ripen readily. The best time to sow them is in January or February.

AZALEA INDICA VARIEGATED.—*Plate* 9, *Fig* 1.

Variegated Chinese Azalea.

Synonmy.—Rhododendron indicum variegatum.

This very beautiful variety is a native of China, from whence it was brought some years ago, but being lost again to Europe, was re-introduced lately, and is now becoming a pretty common inhabitant of our greenhouses, to which a greater ornament could not be brought.

Besides the above, there are six or seven other varieties introduced from the same country. And by a mixture of the pollen of these a great number of splendid hybrids have been raised,

and are continually raising, more or less hardy, to embellish our gardens.

All these kinds may be treated according to the following rules :—

1. *Propagation.*—As soon as the young shoots are four inches long, split them off the old wood, merely trim off any ragged bits with a sharp knife, plant them in pots of fine sand, plunge them in heat, and cover them with a hand-glass.

When struck take them up carefully, and plant them in small pots filled with the soil recommended for the parent plants; re-plunge, and cover again with a hand-glass, until they have begun to grow.

2. *Soil.*—The best soil is one-half heath-mould, one-fourth sandy loam, and one-fourth leaf-mould. Let this be well mixed, and either broken very fine, or sifted before using.

3. *Turning out of doors.*—The first year from being struck it is advisable to treat them a little tenderly; but when they have grown sufficiently strong, place them out of doors as other greenhouse plants, every year, about the end of June, and bring them again into the greenhouse in September.

4. *Housing.*—When brought into the greenhouse, frame, or room, in September, give them abundance of air. When you wish them to be brought into flower, remove them by turns into more heat, and the flowers will expand finer; when expanded, however, place them in a cooler air, and they will continue in bloom a long time.

5. *Watering.*—When the plants are in flower or full growth, a good supply of water is requisite.

6. *Potting.*—Immediately after they have done flowering repot, and again place them in a little heat; this will encourage their growth, and ensure a good bloom the succeeding year.

7. *Drainage.*—Good drainage with broken crocks is indispensible for the health of the plants.

8. *Syringing.*—After re-potting, assist the growth by syringing over the leaves once or twice a week, until the young shoots are six inches long, then remove the plants to a cooler place, and treat them as before.

CULTURE OF THE GENUS BOSSIÆA.

Soil.—Pot in a mixture three parts heath-mould, one part sandy loam, and a small portion of sand, and be careful to drain the pots well.

Propagation.—Plant the cuttings thin, as they are liable to damp off. When rooted pot off, and place in a close frame, or under a hand-glass for a few days, until they have begun to grow.

CULTURE OF THE GENUS BURTONIA.

These plants are very easily lost, apparently without any outward cause; the whole danger lies in stagnation at the roots. Be careful in potting to give plenty of drainage.

CULTURE OF THE GENUS BORONIA.

For the successful culture of this genus, take notice of the following rules:—

1. *Pot* in sandy heath-mould, beaten very fine.

2. *Drainage.*—Fill one-fourth of the pot with broken crocks as drainage, to prevent the possibility of stagnation.

3. *Free growth.*—Never crowd these plants amongst others of a different habit, but place them in an airy part of the house.

4. *Sunshine.*—Direct exposure to sunshine soon proves fatal to them.

5. *Roots.*—Never allow the roots to become matted, for if this is ever the case, it is very difficult to recover the plants to their former health.

6. *Propagation.*—Cuttings root slowly. Do not attempt to hurry them with heat; remove the glass often, wipe it, and allow the cuttings to be exposed a little before replacing it.

CULTURE OF THE GENUS CALODENDRON.

Only one species of this genus is in our collections, and it has of late years become very scarce, arising from the difficulty of increasing it.

It is usual for the cuttings to perish almost immediately after they are planted; this is occasioned by the cuttings being kept too long after their separation from the parent plant. If once the leaves are suffered to flag, there is no hope of success.

CULTURE OF THE GENUS CORRÆA.

Plant ripened cuttings thin in pots of fine sand, and cover them with a bell-glass, without plunging in heat. Wipe the glass occasionally, as they are liable to damp off.

CULTURE OF THE GENUS CYCLOPIA.

The cuttings are very liable to damp off. To prevent this, wipe the glass as often as dew is seen collected upon it.

Chorizema Henchmannii.—*Plate* 9, *Fig.* 3.

Mr. Henchman's Chorizema.

Although several fine species of Chorizema are of later introduction than the *Henchmannii,* perhaps few, if any, can eclipse it for beauty. It was introduced from New South Wales in 1824, and has now become somewhat common in most of our collections.

All the species are easy of culture, requiring only to be potted in a mixture of three parts sandy heath-mould, and one part sandy loam.

They are readily increased, both by cuttings and seeds.

CULTURE OF THE GENUS CITRUS.

Greater part of the plants of this interesting genus, are well known and deservedly esteemed. Fourteen or fifteen species, besides a great number of varieties, are now found in all well-furnished conservatories. The most common in our houses are the varieties of Sweet Orange, (C. Aurantium); Bitter Orange, (C. vulgaris); Lemon, (C. Medica Limon); Citron, (C. Medica); Lime, (C. Limonum); and Shaddock, (C. decumana).

All the kinds of Citrus are naturally inhabitants of warm countries, as China, Japan, East Indies, and various parts of Asia, but notwithstanding they will endure a good degree of cold, although they do not generally thrive well in the open air in our variable climate. In Devonshire, and some other parts of England, good fruit have been produced in fine seasons, by plants trained against walls, on a south aspect.

From the best sources it appears probable that the Orange tree was introduced into Britain during the reign of Queen Elizabeth, perhaps by Sir Francis Carew, or one of the same family, about 1593 or 1594; these were planted in the open ground at Beddington, in Surrey, and were covered in winter with a moveable glass or other case.

The Citron, (C. Medica), was very likely introduced at the same time, or very shortly afterwards. But we have no account of the Lime and Lemon having been brought into British gardens earlier than 1646 or 1648; they were most likely brought either from Spain or Italy, but by whom does not appear. Most of the other kinds are of far later introduction, and indeed new kinds are being received from the French nurseries nearly every year.

How long these trees have been in cultivation in their native countries is unknown, but it is probable from a very early age. The *"golden Apples"* of Hesperides with the many *legends* respecting them, are familiar to every reader of Grecian history.

The cultivation of all the species is very easy, requiring little more than shelter from frost, and plenty of room, and nourishment at their roots.

Soil.—The best soil for the Orange tribe, is one-half rich loam

from a pasture, broken fine, one-fourth leaf-mould, and one-fourth very rotten dung; let it be broken fine when wanted for use, in preference to sifting it

Potting.—Always place these plants in pots rather large, for they will not thrive if often shifted, and if cramped they will not carry their fruit.

Boxes.—When the plants have grown large, the best way is to place them in square boxes; and so let these be constructed that the whole of the sides can be taken out; the soil from the roots can then be removed, and new added with very little inconvenience.

Temperature.—Immediately after being shifted, subject the plants to an increased temperature until they have grown pretty freely, which rule may also be followed with great advantage every year, when the plants are forming their young wood, or ripening their fruit. Never allow the increased heat to be more than 70 deg. Fahr., nor continue it longer than the end is answered; at all other times, the common temperature given to greenhouse plants is sufficient.

Watering.—All the Orange tribe require a good supply of water at their roots, and during the season they are subjected to an increase of heat; syringe over head once or twice in a week, this will greatly facilitate their growth. It is also of immense advantage if they be watered once a week with thin liquid manure.

Air is an indispensible requisite for the whole of the genus, particularly when in blossom; unless plenty be admitted, few fruit will set.

Propagation is performed in various ways, either by cuttings, layers, abscission, seeds, grafting, or budding; the three first are intended to form small bushy shrubs, the seeds are to produce stocks on which to graft or bud for standard trees.

Cuttings.—About the beginning of March, separate with a sharp knife branches of two or three-year old wood, and a foot or more in length, and having cut off the lower ends smooth, plant them in pots of sand, plunge them in heat, and cover them with a hand-glass, and in six weeks, or two months, they will be rooted.

Potting off.—When they are well rooted pot them off in the soil recommended before, but adding a little more leaf-mould, as the plants are small; re-plunge them under the hand-glass, until

they have again begun to grow, afterwards harden them by degrees, and finally place them in the greenhouse.

Layers.—Branches merely pegged beneath the surface of the soil, without any incision, will strike roots; but their emission is greatly facilitated by an incision being made either on the upper or under side of the branch; this incision should be made half way through the branch, and an inch long, sloping upwards.

Pots open on one side from top to bottom, for the more ready introduction of a branch; these pots filled with soil and elevated on sticks, to the necessary height, are the most convenient.

Abscision.—Select a suitable branch, and take off a ring of the bark, about an inch broad, entirely round it; around this ring place a small garden pot, cut so as to admit the branch up the centre of it, then fill the pot with moss or soil, and constantly keep it moist.

Seeds.—Seedlings are generally raised for the purpose of grafting and budding. After the ripe fruit is eaten at table, sow the seeds in pots of light soil, plunge the pots in heat and they will germinate in a short time.

When large enough, pot them off in light, rich soil, and place them in a good heat, until they have again made good roots, then gradually expose them, and set them among the greenhouse plants, until they are large enough to graft or bud.

Grafting.—When the stocks are two years old they are fit for grafting, if dwarfs are wanted; but if standards are required, grafting must be delayed until the stocks are 8 feet high.

If properly and carefully performed, any mode of grafting will succeed. From the middle of March, to the end of April, is the best time.

When grafted, place the stocks in a good heat, and shade them from the sun until the grafts are united, which will be in a fortnight or three weeks, then loose the bandages, and treat them as other grafted plants.

Budding.—July and August are the proper months for budding. After performing the operation, place the stocks in a good heat until the buds are united, which may be known by their plump appearance. The following spring plunge them in heat, head the tops of the stocks to where the buds were inserted, and they will make fine shoots in their spring growth.

Insects.—The Citrus tribe are liable to be infested with the Brown Scale, (Coccus hesperidum), plate 1, figs. 4, *c, d, e, f,* and page 3; the Chermes, (Psylla cratægi), plate 1, fig. 2, *a, b,* page 2; the Red Spider, (Acarus telarius), plate 2, fig. 2, and page 60; and a very small species of Thrips, probably the Thrips minutissima, for the destruction and general habits of which see plate 1, fig. 1, and page 1.

CULTURE OF THE PLANTS BELONGING TO THE NATURAL ORDER.

EPACRIDEÆ.

All the plants in this Order are well deserving a place in every collection. They are all natives of New Holland, are neat growers, and have dry and generally small prickly leaves. The list of genera are as follows:—

Acrotriche,	Epacris,	Ponceletia,
Andersonia,	Leucopogon,	Sphenotoma,
Astroloma,	Lissanthe,	Sprengelia,
Cosmelia,	Lysinema,	Stenanthera,
Cyathodes,	Melichrus,	Styphelea.
Dracophyllum,	Monotoca,	Trococarpa.

1. *Freedom of growth.*—From the delicate foliage of this tribe of plants, it is indispensible that they never be crowded amongst other plants of a different habit. It is advisable, if convenient, to place them altogether, for if this be not attended to, the loss of foliage, if not of the whole plant, will be the consequence.

2. *Summer Quarters.*—In June place them out of doors as other Greenhouse plants, but be particularly cautious not to set them in a situation much exposed to wind, or direct sunshine.

3. *Potting.*—Never allow the roots to become matted, but always pot when the roots have spread moderately through the soil; this is particularly necessary when the plants are turned out of doors, for the sun would otherwise dry up the small fibrous roots, and the loss of the plants is almost certain.

Soil.—The species of Andersonia, Cosmelia, Epacris, Lysinema, Ponceletia, Sphenotoma, and Sprengelia, thrive best if potted in heath-mould, mixed with a good portion of very fine sand.

The various species of Acrotriche, Astroloma, Cyathodes, Dracophyllum, Lissanthe, Leucopogon Melichrus, Monotoca, Styphelea, Stenanthera and Trococarpa, do better if potted in three-fourths heath-mould, and one-fourth sandy loam.

Sifting.—If the soil can be broken sufficiently fine, it is preferable to sifting, because by the latter process too many of the small fibres are separated, and in consequence the soil is liable to bake hard.

Drainage.—Put in each pot plenty of broken crocks, for if there is any deficiency in drainage the plants cannot be kept healthy.

Watering.—Administer water as often as requisite, and be cautious never to allow the soil to become dry and baked, for their tender roots are incapable of enduring such a privation of moisture.

Propagation.—Take off young cuttings in the autumn, plant them in pots of fine sand, cover them with a bell-glass, and place them on a shelf, or other similar situation, and the following spring they will strike root.

Genera, the cuttings of which are very liable to damp off. To prevent this, plant them thin, often wipe the dew off the glasses, and occasionally prop them up, to admit a little air:—

Anthyllis,	Dichilus,	Liparia,
Aspalathus,	Daphne,	Metrosideros,
Calothamnus,	Laurus,	Pinus.
Dalea,		

GENUS CHIRONIA.

These are all very short lived plants, scarcely ever thriving more than two years in succession. The best way is to propagate them every year from cuttings, which strike freely.

GENUS JENKINSONIA.

This genus requires a good heat when in a growing state. Place the plants in a dry but warm situation, and be careful not to over-

water. The pots of cuttings may be placed on a shelf in the greenhouse.

GENUS SPIGELIA.

The chief difficulty in the culture of this genus is in the administering of water,—drain well, water with care at all times,—and keep dry when the tops have died down.

GENUS CANARINA.

After the tops have died down, place in a cool situation, and give no water; and when they begin to grow again, re-pot in light rich soil, and place in the heat of the stove until the plants shew flower, then remove to the greenhouse, and they will continue in bloom a long time.

GENUS CROWEA.

Be careful not to crowd the species amongst other plants, but place them in an open, dry, and airy situation, or they will soon lose their leaves. Pot in heath-mould; give a good drainage, and do not over water.

GENUS PRIESTLEYA.

The stems and leaves of these plants are covered with a thick down, the moisture adhering to which renders them rather difficult to keep during the dark months of December, January, and February. Place them in a dry, airy situation, and be particularly careful not to wet the foliage in watering.

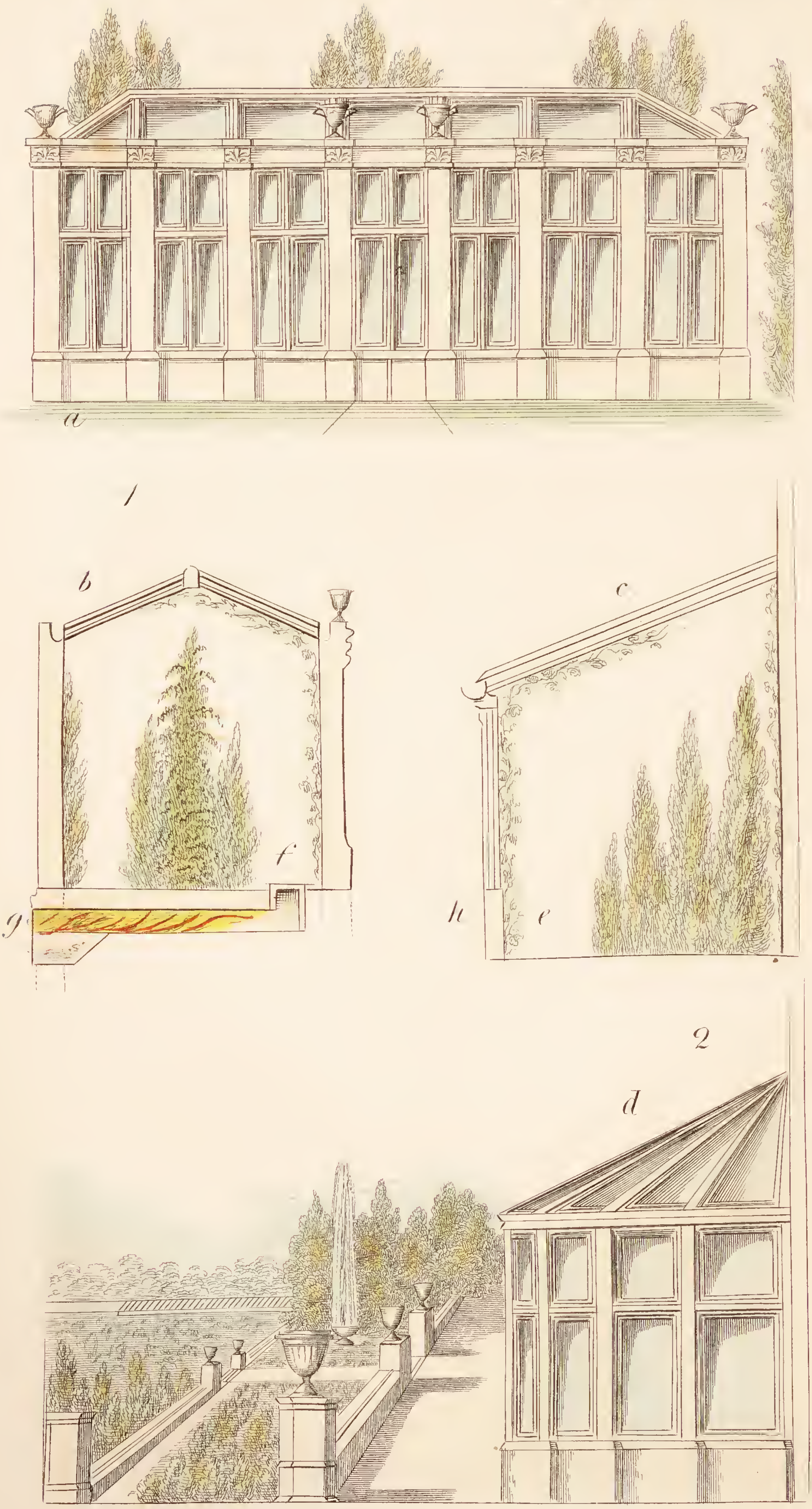
GENUS ENKIANTHUS.

The loss of these pretty plants is generally occasioned by over-watering in winter.

GENUS GNIDIA.

The roots of these plants are very tender, and easily injured; if they are allowed to flag for want of water, or otherwise be over-watered, they are nearly sure to perish. The cuttings also are long in striking.

Plate 10



S. H. Del. — Newbrick Sc. Lpool.

GENUS GOMPHOLOBIUM.

These plants are also very impatient of water, and consequently very difficult to preserve in winter. Place them in an airy situation; give good drainage, and water with great caution.

GENUS CYPHIA.

Keep the tuberous rooted species quite dry during their season of torpidity, and when they show a disposition to grow, repot them. To increase them, take off the young shoots as soon as they are long enough, and plant them in a pot of light soil; allow the cuttings to lie awhile to dry up the wounds, and do not cover them with a glass, or they will generally die.

CULTURE OF CYCLAMEN PERSICUM.

In May, when the leaves have died down, place the pots in a cold place, and keep them perfectly dry, for if any moisture be allowed to come upon the soil the roots are liable to rot, or start into growth, before they have received a sufficient rest.

After they have remained torpid about three months they will begin to show a disposition to grow, shake off all the old soil from the roots, and re-pot them in a mixture of equal parts,—light sandy loam, heath-mould, and leaf-mould; being careful to give a good drainage.

When potted, place them in a sheltered situation out of doors until they have begun to grow, then remove them to the greenhouse, place them on an airy shelf, and if properly attended with water and air they will flower finely.

Watering.—During the season of torpidity give no water whatever. When the plants begin to grow administer a little; when in flower, if the weather be fine, water freely. After flowering, again diminish the quantity until the bulbs are ripe.

Propagation by Seeds.—When the seeds are ripe, sow them immediately in pots of light soil, and place them on a shelf in the greenhouse; do not transplant the young seedlings, but allow them

to remain in the seed pots until their tops die, then re-pot, and treat them as old plants.

CULTURE OF GENUS IPOMOPSIS.

To cultivate these beautiful plants well, take notice of the following rules :—

1. Sow the seeds in August, that the young plants may have sufficient time to become strong before winter, or they are nearly sure to perish.

2. When the seedlings are sufficiently large, transplant them singly into small pots, and as they advance in growth, re-pot them as often as requisite, and allow the plants to be elevated in the centre of the pots.

3. Be particularly cautious to give good drainage, for if this be not attended to, and the roots be not elevated above the surface of the soil, the stems will rot just at their junction with the roots,—this generally happens just before the plants come into flower.

4. Partial shade is necessary, if too much exposed to the sun they will soon die.

5. Never crowd them amongst other plants, but place them free in an airy situation in the greenhouse, and during winter water with great care.

6. The best soil is light loam, mixed with one-fourth leaf-mould.

VERBENA TWEEDIANA.—*Plate* 9, *Fig.* 2.

Mr. Tweedie's Vervain.

This beautiful little plant is nearly hardy, rivalling in richness of colour the well known V. Melindres, which it nearly resembles in habit.

Planted in small beds, it is a great ornament to the flower garden, where, with a very trifling shelter, it will endure the severity of our winters.

It readily propagates by cuttings of the same year's wood, which may be taken off any time during the summer, and planted in pots, or in a common frame, where they will strike freely. Shelter these young plants until the following spring, then turn them out into the beds appropriated to them, and follow the same rule every year.

It is named in compliment to Mr. Tweedie, to whom we are indebted for the introduction of many valuable additions to our greenhouses.

CULTURE OF PRIMULA SINENSIS.

Propagation.—This beautiful plant may be increased, either by seeds or cuttings.

Seeds.—As soon as the seed is ripe, sow it in pots of finely sifted soil, and cover it very slightly.

When sown, place a slate or a piece or glass over the pot, to prevent the soil drying too rapidly; this is preferable to covering the soil with moss, into which the plants sometimes grow, and are in danger of being pulled up on the removal of it.

Watering Seedlings.—Water with great care until the young plants appear, then gradually increase the quantity as they advance in growth.

Potting off.—When large enough, transplant them singly in small pots, filled with very light, rich soil, and re-pot as often as requisite.

Cuttings.—These are made by merely cutting down the old plants, after they have done flowering.

Plant each cutting singly in a small pot, filled with light rich soil, well sifted, or broken very fine; and plunge the whole in a hot-bed, or any other bottom heat, where they can be kept close from air until they have begun to strike, which will be in about ten days, or a fortnight.

After they have struck root re-pot, and remove them to the greenhouse, where they will flower very finely.

In all the pottings be careful to give a good drainage; and water sparingly when the weather is not fine.

CULTURE OF THE TUBE-ROSE.

In February, fill a sufficient number of small pots with rich light soil, and in the centre of each plant one bulb, surrounding it by a little sharp sand.

Plunge the pots in bottom heat, and do not water until they have begun to grow; after which administer water, and re-pot as often as requisite, without breaking the ball. When they are in flower, remove them to the greenhouse. After the tops have died down, keep them perfectly dry.

CULTURE OF PROTEACEOUS PLANTS.

All Proteaceous Plants are handsome growers, with dry neat foliage, chiefly natives of the Cape of Good Hope and New Holland. And although they are usually considered difficult to keep, and more so to propagate, they are deservedly popular, and, to those acquainted with their habits, require little more trouble than that bestowed on greenhouse plants generally.

There are 34 Genera already known in our collections. Some of them, however, are yet very scarce.

Adenanthos,	Hakea,	Persoonia,
Agastachys,	Hemiclidia,	Protea,
Agnostus,	Isopogon,	Quadria,
Anadenia,	Knightia,	Rhopala,
Aulax,	Lambertia,	Serruria,
Banksia,	Lomatia,	Simsia,
Botryceras,	Leucadendron,	Sorocephalus,
Brabejum,	Leucospermum,	Spatalla,
Conospermum,	Mimetes,	Stenocarpus,
Dryandra,	Nivenia,	Telopea,
Embothrium,	Petrophila,	Xylomela,
Grevillea.		

The general culture of the whole is alike, and may be stated as follows:—

Soil.—The best soil is a mixture of two parts heath-mould, and one part light sandy loam, broken fine.

Potting.—Drain well with plenty of broken potsherds, and mix a few pieces of free stone, about an inch square, with the soil. These, by retaining moisture, will prevent the roots suffering immediately from drought, which they are very liable to do.

Do not cramp the roots in pots too small, for they invariably suffer when this is the case.

Watering.—Over watering and drought are two extremes which these plants cannot endure. The roots being tender, water must be administered at all times with care, especially in the winter: drought, however, is more injurious than over watering.

Placing out of doors.—It is advisable not to follow the general usage of greenhouse plants, in placing out of doors during the summer season, for three reasons:—

1st. They are liable to suffer from drought by exposure to the sun and air.

2nd. They are liable to perish from over moisture by rain.

3rd. The roots are liable to be lacerated by the entrance of worms into the pots.

Propagation.—This is effected both by cuttings and seeds.

Cuttings.—Take off ripened cuttings, and plant them thin and shallow in pots of fine sand. Place the pots on a dry, cool floor, and cover them with a hand-glass; water with great care, and in about two months they will have formed roots. If the pots be plunged or placed on moist heat, no success need be expected.

When struck, pot off in small pots, and again place them in a similar situation under a hand-glass until they have begun to grow, then expose them to the air of the greenhouse by degrees.

Seeds.—Sow in March or April, cover thinly with fine sifted soil, and place the pots in a cool, dry part of the greenhouse, where they will be shaded both from sun and wind; cover each pot with a piece of slate or glass, to prevent the soil drying too much, and by the following Autumn they will be up.

Potting off.—When up transplant them singly in small pots, and place them under a hand-glass, as recommended for potted cuttings, until they begin to grow.

CULTURE OF TREVIRANA COCCINEA.

During the season of torpidity when the tops have died down, keep the roots perfectly dry and cool.

Just before the roots begin to grow, turn out each ball, and separate it with a sharp knife into four parts; pot each of these divided parts in a pint (48 sized) pot, filled with an equal mixture of sandy loam, heath-mould, and leaf mould, broken or sifted fine.

When potted, place the plants in a little heat until they have made shoots an inch or more long, then remove them to the greenhouse, and re-pot as often as they require it.

CULTURE OF THE GENERA BELONGING TO THE NATURAL ORDER.

IRIDEÆ.

Nearly all the plants belonging to this Order are deserving cultivation. Many of them are very beautiful, amongst which may be first mentioned the numerous species cultivated under the appellation of "*Cape bulbs,*" consisting of the following genera:—

Antholyza,	Homeria,	Sparaxis,
Anomantheca,	Herbertia,	Spatalanthus,
Anisanthus,	Hesperantha,	Synotia,
Babiana,	Ixia,	Tritonia,
Cyp lla,	Lapeyrousia,	Triconema,
Ferraria,	Moræa,	Tigridia,
Geissorhiza,	Melasphærula,	Viensseuxia,
Galaxia,	Sheptanthera,	Watsonia.
Gladiolus,		

The general culture of Cape Bulbs may be stated as follows:—

Potting.—The proper season for potting is just before the bulbs begin to grow, after their torpid season. Turn them out of the

pots, separate the bulbs from the soil, and after selecting the finest re-plant them in small pots, according to the kinds; of the smaller kinds six or seven in a pot, and of the larger not more than two or three.

Soil.—The best soil is one-half light rich loam, one-fourth leaf-mould, and one-fourth heath-mould, either broken fine or sifted.

Situation when Potted.—After being potted do not subject them to any heat until they have grown considerably, for if this be done, they often grow weakly, and of course do not flower so fine. Any light airy situation will answer where they will be protected from rains and frost.

Flowering.—When the leaves are considerably advanced, and the pots are beginning to be filled with roots, re-pot, and place them in the greenhouse, where they will flower finely, requiring nothing more than the ordinary attention of hardy greenhouse plants, until after the flowering season.

Watering.—When newly potted, and until they have formed good roots, water very sparingly, but as the plants advance towards flowering, increase the supply accordingly, and when in full bloom supply them liberally. After the flowers fade, again diminish the quantity, and when the leaves become yellow and ripe, wholly discontinue it until after the season of torpidity.

Torpidity.—As soon as the leaves are dead, place the pots in a cold situation, where they will remain perfectly dry until the season for their growing again, which will be in about three months after the tops are dead.

Planting in the open borders.—All the above will thrive and flower well, if planted either in a frame, or in the open border; several Ixias, and nearly allied species, however, which flower very early in the spring, must be sheltered, if in the open borders, from frost and snow; this may be done by turning a flower pot over them, and if very severe, covering the pot with a little litter; indeed all are better protected from heavy rains, during the torpid season.

Those planted in the open borders flower better if not removed oftener than two or three years; on re-planting, select the finest roots, as recommended for planting in pots.

Propagation.—This is effected both by offsets as above, and by seeds.

Sowing Seeds.—Sow the seeds very thinly, in pots of light soil, at the same time as for tender annuals; and plunge the pots in heat, to bring them up as early as possible.

Situation when up.—When up place them in a cooler and more airy situation, to prevent their growing weakly.

Watering.—Until the seeds begin to grow, administer no water unless the soil become very dry. As the plants advance in growth, give a greater supply, but when the leaves begin to change colour, diminish the quantity until the leaves are wholly dead.

Torpidity.—When the leaves are totally dead, and before they break off, turn out the soil from the pots, select all the bulbs, dry them on a shelf or other situation, and put them in a paper bag until the season of planting.

BULBOUS SPECIES OF IRIS.

These are planted in the open borders, and, with the exception of sheltering during the season of torpidity, (which from their hardiness is unnecessary,) they are treated precisely as Cape bulbs when planted out. The species having bulbous roots are the following:—

Iris alata,
..... caucasica,
..... lusitanica,
..... persica,
Iris reticulata,
..... tenuifolia,
..... Xiphium,
..... Xiphioides.

Of the above the alata, caucasica, lusitanica, and tenuifolia are met with in few collections.

The *persica* and reticulata require to be planted in a light and rich soil to flower well, and the last species must either be planted in a pit or frame, or a very warm situation out of doors.

The *Xiphium* grows very freely in any rich soil, and has a very fine fragrance. The *Xiphioides* greatly resembles the last. The bulbs are annually received from Holland, and may be purchased of any seedsmen. Plant them as early in the autumn as convenient.

The remainder of the Irideæ are herbaceous plants. These consist of Aristea, Bobartia, Dietes, greater part of Iris, Marica, Orthrosanthes, Pardanthus, Patersonia, Renealmia, Sisyrinchium, and Witsenia.

In several particulars the culture of these genera resemble each other, but as their native localities, general habits, and peculiar structure differ considerably, it will be necessary to mention some of them rather particularly.

Setting aside Iris and Witsenia out of the above list, as offering considerable variety in culture, the succeeding few remarks will apply generally to the remainder; viz.

Aristea,	Orthrosanthes,	Renealmia,
Bobartia,	Pardanthus,	Sisyrinchium,
Marica,	Patersonia.	Dietes.

1. *Soil.*—The best soil is a mixture of one-half light rich loam, one-fourth heath-mould, and one-fourth leaf-mould; but if the species are planted in the open border, light sandy soil will answer, if the subsoil be dry.

2. If planted in the open ground, it will be necessary to shelter them from severe or very wet weather, but in all ordinary weather they require no more than the common attention of half hardy herbaceous plants.

3. *Propagation.*—The usual method of increasing them is by division of the roots, seeds being only occasionally produced. When seeds are ripened, however, sow them immediately, and plunge in a little heat. Allow them to remain in the seed pots until they have become a good size, before they are transplanted.

4. *Watering.*—If they are kept in pots, water very sparingly during the season of torpidity; but the deciduous species, or those entirely losing their leaves in winter, keep quite dry until they shew a disposition to grow again.

WITSENIA.

The chief difficulty in preserving this consists in its liability to be over-watered: to prevent this drain well. Water at all times very sparingly, and place in a very airy situation.

IRIS.

Name.—This name was originally given to this plant by Pliny and Theophrastes.

Native country.—All the species are natives of temperate climates, chiefly of Europe and North America.

Propagation.—All, with the exception of those mentioned before as bulbous, are increased readily by division of the roots, and in some cases seeds are produced, by which new kinds may sometimes be raised.

Forcing-—The kinds that will force well are the *persica, Xiphioides, Susiana,* and *chinensis*; the two first may be brought to flower well in water glasses, like Narcissus, hyacinth, &c. but they will flower much finer in pots of fine sandy loam. After being planted in the pots very shallow, place them in a brisk heat, and after they are up give them plenty of air, and they will flower without any further trouble than are bestowed upon hyacinths. *Susiana* and *chinensis* being tuberous, are merely planted in pots of soil, and placed in heat.

The following kinds are somewhat tender, and require to be planted in a very warm and sheltered situation, to thrive well:—

Iris pallida,	Iris crassifolia,	Iris chinensis,
..... persica,	..... reticulata,	..... clandestina,
..... bicolor,	..... Susiana,	..... tuberosa.
..... dichotoma,	..... cristata,	

The *pallida* ought to be planted in a very light, sandy soil, sheltered from cold winds, and exposed to the full influence of the sun, and where it will be free from much moisture, of which it is very impatient,

The *persica* may be treated like Cape bulbs, as before mentioned.

The *bicolor* should be planted in a richer soil than the pallida, and in a situation somewhat shaded from the sun, for if the flowers are exposed to its influence, they are of so delicate a nature, that they almost immediately wither.

When the weather becomes very cold and wet, the roots should be sheltered by a hand-glass, or some other means, or the plant will quickly perish.

The *dichotoma,* (usually called the scissor plant,) must be planted in a situation free from moisture, and not exposed to cutting winds; in other respects the most common treatment will answer.

The *crassifolia* is more tender than the last, often being kept

in the greenhouse; it is as impatient of moisture as the last.

The *Susiana* plant in a strongish soil, made rich by the addition of manure, and in a situation fully exposed to the sun and air. Though this species luxuriates in a rich soil, it cannot endure moisture in the autumn and winter. It not unfrequently perishes in any situation in the borders; it is therefore well to have some planted in a frame, or kept in pots, to prevent its being lost.

The *cristata* is of directly an opposite habit to the last, this thriving only in a damp, boggy situation, where the water partially stagnates about its roots, but notwithstauding, it does not endure the storms of winter well, it is the safest to cover it with a hand-glass in severe weather.

The *chinensis* may be planted in any moderately warm situation where the soil is well drained; and with a little shelter in very severe weather, it will flourish, and its roots creep to a great distance.

The *clandestina* will grow very well in the open borders during the summer, but must be taken up and re-potted on the approach of frost, as it is very tender; any common light soil will suit it very well.

The *arenaria, biglumis, Boltoniana, bohemica, curtopetala, iberica, tenax,* and *verna,* &c. must all be planted in light sandy soil, in dry situations, all being very impatient of wet, particularly the *arenaria, iberica,* and *tenax.*

The *Amœna, flavissima, ochroleuca, sambucina, spuria, virginica,* and some others, should be planted in a good rich loamy soil, in a moist situation.

The *tuberosa* is considered a native both of England and Ireland, but we have never met with it in a wild state; it flowers freely if treated properly; the flowers are fragrant. The manner of cultivating it is as follows: 1st,—As autumn is the season when the roots spread, be careful at that season never to dig or disturb the soil round it. 2nd,—Plant it in a warm, and very dry situation, and if possible well exposed to the sun. 3rd,—It is impatient of being often removed; it may always stand five or six years without shifting. 4th,—In *propagating,* separate the tubers immediately after the leaves begin to turn yellow, and plant them immediately after separation. 5th,—If seeds are produced, sow them immediately after they are ripe.

The remaining species will do planted in almost any situation, requiring only the most common attention.

CULTURE OF THE CHINESE CHRYSANTHEMUM.

(CHRYSANTHEMUM INDICUM.)

Within these last few years there have been added many new and beautiful varieties of this showy greenhouse plant, and they are extremely valuable on account of the season of their flowering, when few other plants display their beauties, to enliven the dreary months of winter.

Propagation.—They are propagated readily by layers, suckers, division, and cuttings.

Layers.—This is performed in June. Merely peg down the shoots, without making any incision, and they will have struck in a month.

Suckers are separated when the plants have begun to grow in spring. Either pot them in small pots, or in other situations which are convenient.

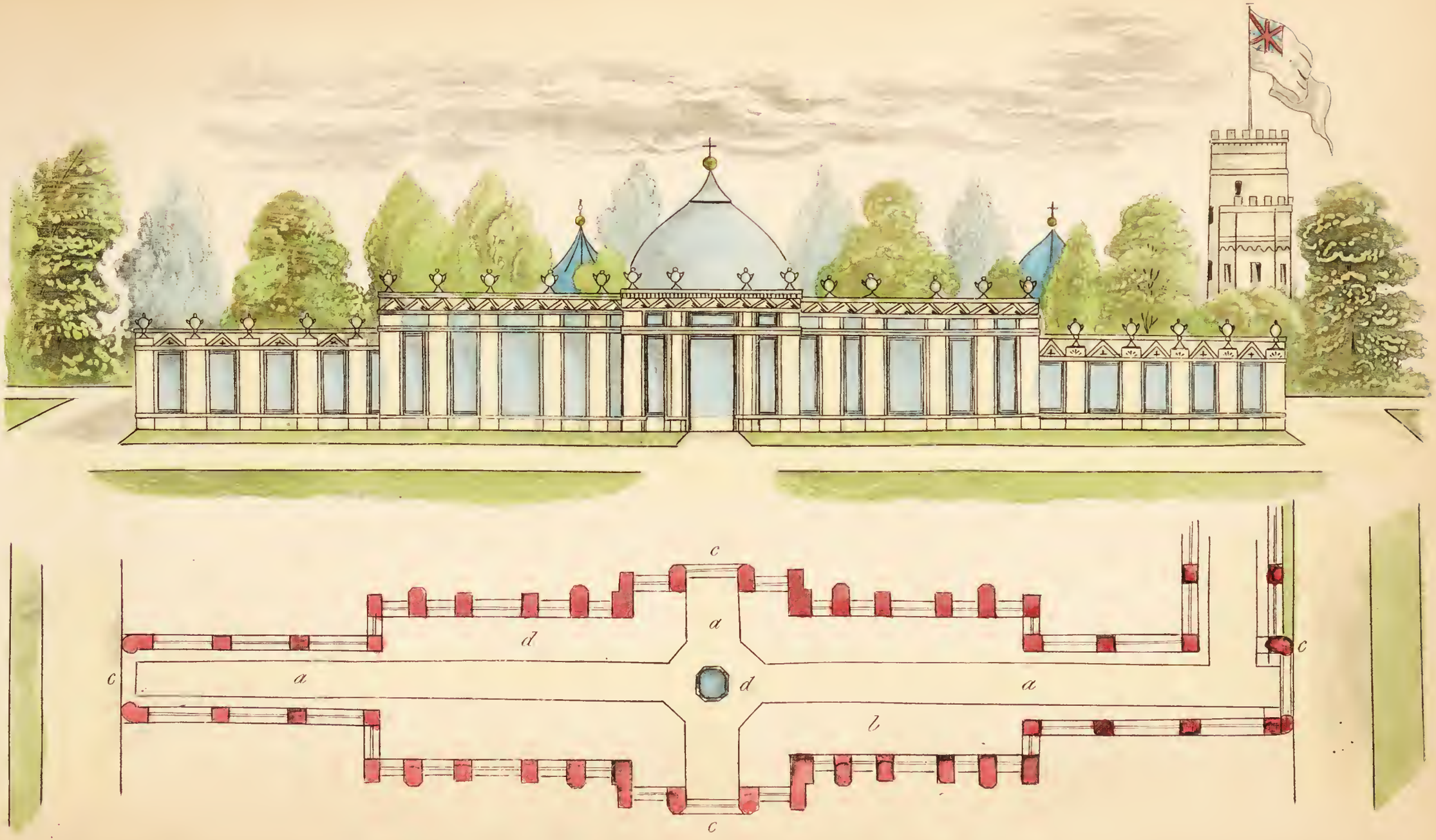
Division of the roots.—This mode of propagation is practised chiefly where the plants are intended for the borders. Merely separate the roots with a knife or spade, and plant them in the situations desired.

Cuttings.—Separate them in spring, as soon as the young shoots are grown sufficiently long for the purpose; cut them off at a joint near the base.

Plant them either under a hand-glass, or in pots; if the latter, place them in a little heat until they are struck.

When they have struck root, stop the leading shoots, to cause side shoots to push out; and as soon as the small pots are filled with roots re-pot, continuing to do so as often as they require it, until they are full grown.

Towards the end of June, after the plants have been re-potted, place them in a warm situation out of doors, where they will not receive too much direct sunshine.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In *potting,* do not pare the roots with a knife; but if not much matted, place the balls entire into fresh pots.

The pots suitable for them to flower in are about 6 or 8 inches wide, and the same in depth.

The best soil for those grown in pots, is a mixture of one-half light rich loam, one-fourth leaf-mould, and one-fourth rotten dung.

CULTURE OF THE GENUS PELARGONIUM.

This genus contains many species and varieties, all very interesting, and chiefly natives of the Cape of Good Hope. They are of four kinds:—1st, Shrubby.—2nd, Succulent. 3rd, Tuberous. And 4th, Herbaceous.

1.—*Shrubby Pelargoniums.*

The whole of this division are usually known by the name of Geraniums, they have long been universal favourites, and are cultivated by all classes of individuals. And the many splendid hybrids which have been added, and are daily adding to our already large collection, render this genus one of the most interesting.

Propagation.—This is performed both by seeds and cuttings; the former for raising new varieties, and the latter to increase those already in possession.

Cuttings.—These may be put in at any time from March to August. If convenient, prepare a hot-bed for the purpose, place on a frame, and lay on the bed about 6 inches depth of old sifted tan, or very light soil; plant the cuttings singly in thimble pots, or if that is not convenient, plant three or four in each 60-sized pot; plunge the pots up to the rim, shade for a day or two at first, then allow them to be exposed to the rays of the sun, but give no air until they are struck.

If it is inconvenient to make a hot-bed, they strike readily under a hand-glass without heat, planted in sifted leaf-mould, or any other very light compost; they will also strike freely if planted in a pot, and set in the window of a room.

Seeds.—The best way is to sow the seeds as soon as ripe in very light soil, and place them in a little heat.

Soil.—Form a compost of one-half sandy loam, one-fourth leaf-mould, and one-fourth heath-mould, and a little very rotten dung; beat all well together, and sift through a coarse sieve.

Potting.—As a general rule, early in February and in June, are the most proper times for potting; the first encourages the plants to make new roots, and causes them to flower finely; and the last assists their summer growth; but if it is intended in June, to turn them out into the borders, as is often the case, the second potting may be entirely dispensed with.

Summer Quarters.—When the flowers have fallen, and the plants intended to remain in pots are potted, place them out of doors for the summer, turning those which were intended into the open borders, and those remaining in pots place in a situation somewhat sheltered.

Watering.—In summer give abundance of water, whenever the plants require it, and occasionally syringe; but in winter do not wet the leaves, and follow the general rule laid down, page 102.

With respect to *Housing* the plants again in the autumn, *Top-dressing, Air, &c.* refer to the general rules, page 102.

Those persons who delight to have these plants in the borders in summer, and have not the conveniency of a greenhouse, may preserve them through the winter, by taking the plants out of the borders in the autumn, shaking off the soil from the roots, and then planting them close together in fine sand, either in a glazed frame, or in a box, which last might be placed in the window of any room where the frost could not injure them; give little or no water until spring, when they may be again planted in the borders.

2.—*Succulent Species.*

Pot in the same soil as recommended for Shrubby species. Place in a warm situation in the house. Drain well, water cautiously, and do not turn out of doors in the summer.

3.—*Tuberous Species.*

Pot and drain after the manner of Succulents. Give no water when the tops have died down. Increase by dividing the tubers whilst in a torpid state.

4.—*Herbaceous Species.*

When in a torpid state give them very little water. They are readily increased by cuttings, both of the roots and stems, and also by seeds, which are often produced freely.

CULTURE OF THE GENUS CALCEOLARIA.

Calceolarias are all nearly hardy, and may be treated generally after the manner of half-hardy, or frame plants, page 105. They are of four kinds,—Shrubby, Herbaceous, Biennial, and Annual.

1. The Shrubby kinds, as bicolor, integrifolia, angustiflora, &c. are increased by cuttings of the half-ripened wood, and by seeds. Plant the cuttings any time during spring and summer, either in pots, or under a hand-glass, in a bed of leaf-mould. When struck, pot off in light and very rich soil, and treat precisely as other hardy greenhouse plants.

2. The herbaceous species are increased by division of the roots during the season of torpidity. Re-pot them as often as they require it, and about the beginning of April they may be finally placed in peck pots, in which they will flower finely; or if thought best, they may be turned out into the open borders.

Soil.—The soil should be made very rich,—say about one-half very rotten dung, one-fourth sandy loam, and one-fourth leaf-mould.

To flower late.—It is only necessary to cut off the flower stems just before the flowers expand; top-dress the plants, and encourage their growth, and about the beginning of October they will again flower fine.

Sheltering.—In all wet and severe winters, it is advisable to shelter the plants in frames, although in Ireland they endure our winters very well.

3. The Biennial and Annual species are just treated as are other tender Biennials and Annuals, see pages 88 and 89. Pot them off when sufficiently large, and afterwards either turn them out into the borders, or place them in the greenhouse to flower.

CULTURE OF THE TREE PÆONY.—(PÆONIA MOUTAN.)

The Tree Pæonies are readily cultivated, and may be increased by either layers or cuttings.—In forming *layers,* peg down the branch, and give a twist sufficient to check the ascent of the sap.—*Cuttings* strike freely under a hand-glass without heat. And also in a sheltered situation, without any covering of glass.

CULTURE OF THE GENUS ERICA.

In describing the culture of this interesting genus, the Greenhouse species may be divided into two kinds.—*First,* such as are strong and free growers, the young wood of which is fleshy, and quickly suffers if the plants be exposed to drought; and *second,* such as do not grow rapidly, are weaker in their wood, will endure some degree of drought without injury, and suffer if they receive much water.

The only difference in the culture of these two divisions consists in this,—the *first division,* being strong growing kinds, and their native localities being somewhat different from the second, require more water, and thrive better if placed in somewhat large pots for their size.—The *second division,* being more impatient of wet, require to be particularly well drained, and placed in smaller pots than the first division; in all other respects the tender species may be treated alike.

The general management may be stated as follows:

1. PROPAGATION.—This is performed both by cuttings and seeds.

Cuttings.—These are made of the ends of the young shoots, when they have become about half ripe; plant them in pots of fine sand well drained, as hereafter mentioned, being careful to select for each pot, kinds of a similar habit.

Fill the pots for the reception of the cuttings, more than half full of broken crocks, for drainage, lay over this a little moss, and fill up to the rim with fine sand, afterwards sprinkle a little water through a rose watering pot, to settle it.

Make the cuttings from an inch to an inch and a half long, according to the kind, splitting them off at their junction with the old wood, cut the end smooth with a very sharp knife, and take off the foliage about half way up each of the cuttings.

Plant the cuttings with a small dibber, the thickness of a quill; sprinkle with water, and when a little dried cover with a bell-glass; then place in a dry and shady situation in the greenhouse or stove, but do not plunge the pots; and wipe the glasses as often as the dew collects upon them.

Seeds.—Sow in finely sifted heath-mould, and be careful not to over water.

2. Soil.—The soil most proper is the sandy black soil on dry moors, where the wild heath grows naturally; if not sufficiently sandy, mix some fine sand along with it.

3. Freedom of Growth.—Never crowd the plants close together in the greenhouse, for they will not prosper unless they have sufficient room for growth.

4. Air.—Too much air cannot be given, if the weather is fine, for if this be not attended to, the foliage being close and tender, will be liable to fog off.

5. Fire Heat.—In case of very damp weather, or frost, fire may be employed with advantage, but if the house can be kept sufficiently dry, it is better never to make use of it.

6. Potting.—Drain well, place the plants high in the centre of the pots, and mix in the soil small pieces of freestone, from half an inch to an inch square, according to the size of the plants; this system was first adopted by Mr. M'Nab, of Edinburgh.

7. Watering.—In summer they require watering freely, and occasionally syringing; but in winter keep them rather dry than otherwise, and never wet the foliage.

8. Placing out of Doors.—In summer place out of doors as other greenhouse plants.

9. Insects.—The only insects infesting these plants is the Aphis. These may be destroyed by sprinkling weak tobacco water over the infested plants, as tobacco smoke is very injurious to the foliage.

MANAGEMENT OF PLANTS, WATER GLASSES, AND CUT FLOWERS, IN ROOMS.

Plants in rooms are easily managed, and may be grown to as much perfection as those in a greenhouse, provided attention be paid to the following particulars :—

1. Whether the natural habits of the plants are suitable for such a situation.

2. Whether the rooms in which they are placed be suitable for the purpose.

3. Whether the plants are potted in proper soil, and pots suitable to their size and habits.

4. Whether water be administered at proper times, and in suitable quantities.

5. Whether the leaves of the plants be allowed to become filthy.

1. With respect to the first particular it may just be said, that most of the plants from the Cape of Good Hope, New Holland, China, and the South of Europe, will grow freely, and flower in a light room as well as in a greenhouse.

Amongst these might be mentioned.—

Camellias.
Geraniums (Pelargonium, page 147.)
Myrtles, and most other myrtaceous plants.
Fuchsias of all kinds.
Chinese Azaleas of all kinds.
Gardenias of several kinds.
Acacias of most kinds.
Oranges, &c. &c.

And besides these violets, and bulbous plants of various kinds, as Hyacinths, Narcissus, Van Thol Tulips, Crocus, and various others.

Ericas will *never* prosper long in dwelling houses.

2. As to the suitableness of the rooms, two things must be considered. 1st, Whether there be sufficient light; and, 2nd, whether a sufficient quantity of pure air can be admitted. If the rooms be dark and close, no plants will thrive in them, and if air cannot be admitted, weakness and loss of foliage will be the consequence.

3. If the plants are not potted in proper soil, and suitably sized

pots, they cannot long prosper. For directions on this head, see page 103-4.

4. Judicious watering is essential to the well being of plants. For directions, see page 102.

5. Filthiness on the leaves stops up the pores, and soon changes their colour; if it arises from dust, wash it off by watering the plants over-head, or setting them out in showery weather when it is mild, but if it arises from insects, these must be destroyed, as in pages 52 to 64.

WATER GLASSES.

Change the water at least twice a week, do not start the bulbs before the beginning of November, for if forced much earlier they grow weakly. The kinds most suitable for glasses are Hyacinths and Narcissus, all the other kinds of bulbs do far the best in very sandy soil.

CUT FLOWERS.

Change the water at least three times a week, and each time cut off a little from the ends of the flower stalks with a sharp knife, placing in the water each time a small bit of saltpetre, about the size of a pea, the flowers will then continue for a long time.

SIZE OF FLOWER POTS.

1st Size, usually called thimbles, 2 inches wide, 1½ in. deep.
2nd ditto, sixties, (60-s.), 3 in. wide, and 3 in. deep.
3rd ditto, forty-eights, (48-s.), 4 in. wide, and 5 in. deep.
4th ditto, Thirty-two's, (32-s.), 5 in. wide, and 6 in. deep.
5th ditto, twenty-four's, (24-s.), 6 in. deep, and 6 in. wide.
6th ditto, sixteen's, (16-s.), 8 in. deep, and 8 in. wide.
7th ditto, twelves, (12-s.), 9 in. deep, and 8½ in. wide.
8th ditto, eights, (8-s.), 10 in. deep, and 9 in. wide.
9th ditto, sixes (6-s.), 11 in. deep, and 10 in. wide.
10th ditto, fours, (4-s.), 12 in. deep, and 11 in. wide.
11th ditto, twos, (2-s.), 12 in. deep, and 12 in. wide.

In all these sizes there are trifling variations, in forming what are called *flats* and *uprights*.

ON THE ERECTION AND SITUATIONS PROPER FOR CONSERVATORIES & GREENHOUSES.

Greenhouse Plants being natives of mild climates, require no artificial heat, except to dry up excessive dampness, or prevent injury from frost. This being kept in mind, all persons intending to build habitations for plants of this description, may, without any detriment to the plants, use considerable liberty, both as it respects situation, form, and internal arrangement.

The situation, mode of construction, internal arrangement, and the plants which occupy it, are the means whereby one structure is distinguished in its name from another. The first of these we may mention is the—

HEATH HOUSE.

This is simply a common Greenhouse, having a stage of either wooden or stone steps, to elevate the plants near to the glass. This kind of structure is generally a lean-to, with a common smoke flue along the front, to throw in a little heat in case of frost, or excessive wet. If the collection of tender heaths be small, a house specially devoted to them is unnecessary. See page 150.

CAMELLIA HOUSE.

If the collection of Camellias be large, and require a house to be appropriated specially to themselves, always select an east or western aspect on which to build it, as the plants flourish best with considerable shade; in other respects it may be made like a common Greenhouse. See page 4.

ORANGE HOUSE.

Orange trees enjoy shade, and may be grown very well in any house, with a very moderate portion of light, provided the roof be sufficiently high, and the whole so constructed that the house can be kept dry, and plenty of air admitted.

Plate 12 a.

MIXED, OR COMMON GREENHOUSE.

Greenhouses are either built *attached* to a wall, or building of any kind, or placed in a detached situation in the flower garden.

The only difference betwixt a Conservatory and a Greenhouse is this;—in a Conservatory, the plants having room for their growth, are placed in large pots or tubs on the floor, or planted in prepared borders; whereas in the Greenhouse the plants are kept small, and placed on stages, either of wood or stone.

A Greenhouse attached to a wall, or other building, need not differ in its general form from a Hot-house, (see plates 5 and 6, and pages 92—98); but as the plants require less artificial heat, the flues must form no prominent feature, as they do in houses appropriated expressly to forcing,—but should, on the contrary, never be exposed to view where it can be avoided.

In respect to choosing the site, aspect, materials, glazing, &c. &c., follow the rules given in pages 92 to 98; but the dimensions may be less or more, to please the fancy or the nature of the situation.

The walk three feet wide, however, should be made in the front, from which should spring a stage of steps, extending to the back wall, or otherwise, as may suit the place, and to any desired height. The flue should either run under the stage, or close to the front wall, having, however, a cavity betwixt it and the wall; and to prevent any loss of heat, over this might be placed a stage for small plants, as shown in plate 6.

It is always desirable, if it can be done, to build the greenhouse contiguous to, or within the "*Flower Garden*", in preference to placing it, as is generally found in Ireland and many places in England, attached to the forcing houses in the Kitchen Garden.

If the house is to stand detached, observe the following rules:—

1. With respect to the form, let this be always made to correspond, more or less, with the mansion to which we may suppose it to be contiguous. See the two lower figures on plate 6, and the upper figure on plate 10, where the form of a detached conservatory is figured.

2. If convenient, let the house be glazed on all sides, but if this cannot be done, let three sides be glazed.

3. For a large mansion, no house in such a situation should be less than thirty or forty feet long, and from fifteen to twenty feet high in the centre ridge; the outside parapet wall should be about two feet high, and the sashes set upon it not less than four feet.

4. A trellised cirb should be formed equal in height with the top of the parapet wall, and continued all round the house.

5. The walk should be made all round about three feet wide.

6. A stage with steps, on which to place the plants, should occupy the centre, the whole length of the house.

7. The flue should either be carried round the house beneath the stage, or perhaps what is better, be carried round the outside of the walk by the parapet wall, from which it should be separated by a cavity two inches wide, as shown in the two lower figures, in plate 6.

8. The fire-place may be made either at the back, or at one or both the ends, according to the size of the house; and the smoke may escape from the centre of a vase, placed as an ornament on the top.

9. A row of columns should be placed down the centre to support the centre of the roof, these may be covered with climbing plants.

CONSERVATORY.

Conservatories are distinguished from greenhouses by the plants in them being allowed to grow to a large size, and in many cases being planted out in prepared borders.

Plate 10, Fig. 1, shows a design for a detached conservatory, of a moderate size, and not very expensive; the length is 40 feet, the breadth 15 feet, and the height 18 feet; such a house with three sides glazed, would be very light, and if properly ornamented to suit the mansion would look very well. *a* Shows the elevation; *b* the section, and the direction of the flue; and *g* the fire-place behind the back wall.

But if one of a large and splendid character is required, such an one might be constructed as that shown on plate 11, modified of

course to suit the situation. The expense of erecting it would not be very great, considering the appearance it would make. It is supposed to stand on higher ground than the mansion behind it, and to be connected with it by means of a glass case, 12 feet wide, and 12 feet high.

The end wings are the same width and height as the case, and 30 feet long.

The two centre wings are 22 feet broad, 24 feet long, and 15 feet high.

The central body is 28 feet broad, 16 feet 6 inches high, and 20 feet long, surmounted with a dome 15 feet high; the length of the whole without the case, (which may or may not be added), is 128 feet.

There are four outer doors, *c c c c*, one on each front in the centre, and one at each end of the building.

The walk, *a a a*, is carried straight through the centre of the house, as shown on the ground plan.

In the centre, is an ornamented basin of water, *d*, which may either be formed into a fountain, or otherwise, as may please the proprietors.

Two fire places are necessary, which must be placed either entirely beneath the floor of the house, and be entered by an ornamental archway, or in any other situation, where they will not be visible.

The walls of the building may be either built of bricks, and cemented, so as to give the appearance of stones; or, what is better, built of dressed stone.

A number of vases may be placed outside on the top, through two of which the smoke from the two fires may escape.

In most cases, the plants occupying the conservatory are planted out in prepared borders; it is best only to plant those out which are of slow growth, and unless the house be very lofty to keep the quick growing kinds in tubs, for it is often the case when they are planted indiscriminately, the strong and quick growing kinds reach the roof too soon, overshadow the slow growers, and for the want of their roots being kept within bounds, seldom flower.

To prepare the borders.—Dig out the soil from two to three feet deep, according to the kind of plants designed to be placed in it,

and the size the plants are desired to grow; lay a good layer of brick rubbish at the bottom for drainage, and fill up the borders with suitable soil, (see page 103,) in which place the plants.

Those kept in pots and tubs are treated just as other green-house plants.

If it be desirable to have such a structure attached to a mansion, this may be done for a less expense than building a detached house, and may be made either to form part of the mansion itself, or else make a lean-to roof, and ornament it to correspond with the building.

Plate 10, Fig. 2, *c* shows the section, and *d* the elevation of such a house, which may be built for a little expense, and made to suit the taste of the proprietor. The height at the back, where the roof rests against the wall of the mansion, is 18 feet; the breadth to the outside of the front parapet wall, 15 feet; height of the parapet wall, (*h*) 3 feet 6 inches; height of the sashes placed upon the parapet wall, 6 feet 6 inches; walk round the front, (*e*) 3 feet or more wide.

The flues may be made to pass under the floor, and the heat from the cavities be admitted into the house through brass grates, of neat designs, fixed in the paving of the floor at proper distances.

THE OPEN FLOWER GARDEN.

We shall commence in this department, by noticing the various Insects infesting many of our choice Flowering Plants; also mention the Culture as we proceed; and, finally, close with a few directions for forming Flower Gardens, planting Shrubberies, &c.

THE ROSE TREE.

The insects infesting this favourite ornament of the garden are very numerous, and although some hereafter mentioned are not very injurious, yet all may be considered in the light of depredators, and are sufficiently prevalent to merit our attention. The first we shall notice are such as only cause blotches on the leaves, but never, unless very numerous, are capable of materially damaging the plants. The chief of these are the

MICROSETIA RUFICAPITELLA.

Red-headed pigmy Moth.—*Plate* 12, *b*. *Figure* 6.

Order, *Lepidoptera Nocturna*. Division, *Yponomeutidæ*.

Synonym.—Tinea ruficapitella.

The eggs of this moth are laid on the under side of the leaves in May and September.

The first breed of caterpillars are hatched in the beginning of June; they are then so small as scarcely to be visible to the naked eye; each insect immediately eats into the parenchyma, or substance of the leaf, every one forming a separate residence for itself; each proceeds eating in a longitudinal direction, carefully avoiding any

injury to the outer skin of the leaf, which protects it safe from birds, and every variation of the weather; here they continue till about the middle of July, when they are full fed, being then about the sixth of an inch long, of a dull yellow colour, with a brown head

When full grown they eat their way out of the leaves, usually on the upper surface, and for the first time since their entrance into the leaves, appear in the open air. They crawl over the leaves, and select secure places on the branches, where they may pass into the pupæ state; these situations are usually against the spines. Having selected a proper situation, each forms for itself a small white flat cocoon, which in a few days assumes a greenish brown colour, and so nearly resembles the colour of the branch as scarcely to be distinguishable. Here they remain until the beginning of September, when the perfect moths appear.

The perfect insect, (Fig. 6,) is about a quarter of an inch broad when the wings are expanded; when reposing, it presents the appearance of the insect resting on the leaf, immediately above the figure (6), in the act of flying. The first pair of wings are white with a yellow tinge on the shoulders, and a slight tinge of blue at the extremities; the second pair are dull white, and the head and shoulders red.

The wounds occasioned by the mining of the little caterpillars during their residence in the leaves, resemble the two serpentine figures on the two leaves on each side of the perfect insect at rest.

The second brood commence their depredations about the middle of September, are full fed, and go into the pupæ state by the end of October, and the perfect moths appear the following May.

MICROSETIA SERICIELLA.

Satin Pygmy Moth.—*Plate* 12, *b. Fig.* 4.

Order, *Lepidoptera Nocturna.* Division, *Yponomeutidæ.*

Synonym.—Tinea sericiella.

This species in dry seasons is often very prevalent upon roses trained against walls. It blotches the leaves after the manner of

the last, but the blotches are not longitudinal, but present the appearance of the spots on the leaf immediately beneath the insect, Fig. 5. The caterpillars scarcely exceed the eight of an inch in length when full grown, are of a dirty brown colour, with a darker head, and go into the pupæ state in October, and the perfect moths, (Fig. 4,) appear the following June. Whether they are double brooded or not we are unable to tell, but would suspect their habits and economy resemble the last.

The perfect moth measures nearly a quarter of an inch when the wings are expanded; its colour is blackish brown, with a silky gloss, which gives its wings various shades of darkness, according to the situation in which it is viewed; lower wings something paler.

To destroy the Leaf Miners.—Should the above insects ever become so numerous as to disfigure the plants, they may easily be destroyed, by syringing occasionally, with equal parts of lime and soot water, from May to October, particularly at the seasons when the parents deposit their eggs.

LOZOTÆNIA ROSANA.

Rose-leaf Roller.—*Plate* 12, *a*. *Fig.* 1.

Order, *Lepidoptera Nocturna*. Division, *Tortricidæ*.

Synonyms,—The Rose moth.—The Worm in the bud.—Tortrix rosana.—Phalæna rosana.

The caterpillars of this beautiful moth are very destructive to the blossoms of the rose, being popularly denominated "the worm in the bud." We believe they are single brooded; the eggs are laid by the parent towards the end of June; these are hatched in a few days, and the young caterpillars immediately commence eating into the buds, which they totally destroy. They continue feeding till the end of August, or beginning of September, when they are full fed, being then the size and colour as shown on plate 12[a], figure 1; they then form a shining brown cocoon under the leaves, rolling them together, and tying them fast with numerous threads, forming a little web.

The perfect moth (1) appears the following June, just at the time the flower buds begin to be formed. Its wings, when expanded, measure about half an inch across. *First pair,* with a yellow ground, closely netted with red, having three dark red cross bars; the first a short distance from the base, the second across the centre, and the third near to the extremity, leaving a narrow yellow border; at the base is a dark red streak, slightly arched, reaching to the first bar, and a little beneath the arched streak is a club-shaped streak, reaching also to the first cross bar. Head and shoulders the same colour as the upper wings. *Lower wings* dark,—body corresponding with the lower wings.

On destroying the Leaf-Rollers.—By what ready means these little creatures may be kept within due bounds we are unable to say. A method we have practised is, to cut off all the affected buds whilst the caterpillars are within them. If these be carefully destroyed, few will be found to attack the plants the following season.

The buds inhabited by these caterpillars are easily distinguished by their swelling without expanding, and a small perforation being discoverable on one side.

BISTON BETULARIUS.

Pepper Moth.

Order, *Lepidoptera Nocturna.* Division, *Geometridæ.*

Synonyms,—Spotted Elm Moth.—Phalæna betularia.—Geometra betularia.

This moth is double brooded, the first appearing in June, and the second in September. The eggs of the June brood are hatched in July, and are full fed by the middle of August, when they go into the pupæ state, burying themselves in the ground, and the perfect moths appear in the beginning of September.

The eggs of the autumn brood are laid on the stems of the rose trees, and there remain until the following spring, and are hatched about the time of the expansion of the leaves; by the middle of May they are about an inch long, and shortly afterwards go into

Plate 12 b

Jaune Despres Rose

the pupæ state, the moth appearing about the beginning, or towards the middle of June.

The caterpillars are greyish brown, with a faint red line down the centre of the back. In some seasons they are rather numerous, but as they feed only on the leaves in the season of luxuriant growth, the injury occasioned by them is trivial.

The perfect moth measures, when the wings are expanded, an inch and a half; all the wings are dirty white, clouded with pale ash, and thickly spotted over the whole insect with black, whence the name "pepper moth."

HARPALYCE FULVATA.

BARRED YELLOW MOTH.—*Plate* 12 *a*, *Figure* 2.

ORDER, *Lepidoptera Nocturna.* DIVISION, *Geometridæ.*

Synonyms.—Clouded yellow moth.—Orange rose moth.—Phalæna fulvata.—Geometra fulvata.

This beautiful little moth appears early in June, and in a dry season may be caught in abundance, by beating the rose bushes.

The caterpillar is greenish yellow, with a white mark, bordered by a darker one on each side. It feeds voraciously on the leaves of the rose tree, but does not appear to attack the buds.

The parent lays her eggs in July, and the caterpillars are full fed in September; they then enter into the pupæ state, burying themselves in the ground, and forming brown cocoons. The perfect moths appear the following June.

The wings measure, when expanded, about an inch across. *First pair* tawny yellow, with a deep and broad band across the centre of each; *second pair* pale dull yellow, with darker margins.

SATURNIA PAVONIA MINOR.

EMPEROR MOTH.—*Frontispiece.*

ORDER, *Lepidoptera Nocturna.* DIVISION, *Bombycydæ.*

Synonyms.—Phalæna pavonia minor.—Small Peacock Moth.

This beautiful moth is double brooded, the first flight of moths appearing about the middle of May, and the second about the end of July. The expansion of the wings measure from two inches and a half to three inches, the males being the smallest. *First pair* of the male grey, covered with shining white scales, and deeply shaded with dull purple, having two bands on each, and a black eyelet on the centre of each; *second pair* orange, shaded with dull black, and having also an eyelet on each, and a broad black band near the margin.

Caterpillars, when full grown, bright green, with yellow warts on the sides, and several black rings.

These little creatures are very voracious, feeding at first in company, but as they become older they lose all sociality, and will even devour each other, whenever they come in contact. A friend of ours, five years ago, brought us a number of them, which he collected on the common ling, (Culluna vulgaris.) We placed them in a feeding box, and supplied them with abundance of food, but they preyed upon each other, and only one survived, which ultimately became a perfect moth. Perhaps the above circumstance may serve to account for their numbers never being very great.

These moths are double brooded, the *first* flight appearing from the middle to the end of May, and the *second* about the end of July.

These moths are very beautiful, and as the caterpillars feed only upon the leaves, and are never very numerous, the rose trees do not suffer from their attacks; any means therefore to destroy them are unnecessary.

GASTROPACHA QUERCIFOLIA.

Lappit Moth.

Order, *Lepidoptera Nocturna.* Division, *Bombycidæ.*

Synonyms.—Phalæna quercifolia.—Bombyx quercifolia.

The eggs of this moth are hatched in June, and the caterpillars continue to feed on the leaves until September, when they enter

into the pupæ state, and the perfect moth appears the following May.

The caterpillars are light brown, banded with dull blue, and when full grown are large, covered with many tufts of short hairs. The perfect moth is rusty brown, and measures, when the wings are expanded, about two inches. The upper pair has three wavy black lines, and a black spot in the centre and slightly shaded with purple; the lower wings have two wavy lines crossing them, and are spotless.

LAMPROPTERYX BADIATA.

Rusty Brown Moth.

Order, *Lepidoptera Nocturna.* Division, *Geometridæ.*

Although this pretty moth is occasionally met with on the rose tree, yet it frequents woods rather than gardens. It appears to be double brooded, the first moths being seen on the wing in March, and again, what we suspect to be a second brood, about the end of July. We are unacquainted for the most part with their economy, and as they are rarely numerous in gardens, no injury worth naming is done by them.

The *wings* of the moth measure, when expanded, about an inch; *first pair* reddish brown, darker at the base, and having a white spot in the centre, and several other pale scattered spots; *second pair* rather pale buff, darker towards the margin.

ORGYA ANTIQUA.

Common Vapourer Moth.

Order, *Lepidoptera Nocturna.* Division, *Arctiidæ.*

Synonyms.—Vapourer.—Red Spot Tussock.—Bombyx antiqua. Phalæna antiqua.—Antique Moth.—Phalæna paradoxica.—White Spot Tussock.

This interesting little moth does no injury to the rose trees, although in some seasons the caterpillars are numerous; but the season of their feeding being that of vigorous growth, and their continuing but a short time in the larvæ state, render it unnecessary to adopt any means for their destruction.

The wings of the *male* moth are about an inch and a quarter across, when expanded. *First pair* dull red, clouded with brown, and having a white spot near the lower side of the outer edge. *Second pair* paler, and without spots. The *female* is without wings, and seldom moves from the place where she issues out of the cocoon.

Caterpillar blue-grey, with a row of orange and red spots on each side from head to tail, four white tufts on the back, and many other tufts of long loose yellow hairs, with two long black tufts proceeding from the head, and one from the tail, measuring, when full grown, an inch and a half long.

ORGYA GONOSTIGMA.

Scarce Vapourer Moth.

Order, *Lepidoptera Nocturna.* Division, *Arctiidæ.*

Synonyms.—Orange Tussock-Moth.—Brown Vapourer.—Phalæna gonostigma.—Bombyx gonostigma.

The male moth is rather larger than the last, and of a darker colour, having on each of the first pair of wings two pure white rings, one on the upper surface of the outer margin, and the other on the lower, connected with each other by an irregular white line; lower wings brown, with a paler border. The female is wingless.

Caterpillar with four yellow and five white tufts along the back, but in colour and other particulars resembling the *antiqua.*

Besides the moths before mentioned, there are two others commonly found in autumn, chiefly resting on the under side of the leaves of the China rose, when trained against a wall.—The first of these is

Plate 12 *a, Figure* 3.

This appears in the perfect state about the middle of September,

but of its habits and economy we have had no opportunity of observing: whether the buff caterpillar figured near the "barred yellow moth," which is occasionally met with in summer, be the same insect in a larvæ state, we are unable to say. They do no injury.

Plate 12 *b*, *Figure* 7.

These pretty little creatures appear in the perfect state in August, and shortly afterwards a number of small caterpillars (*Fig.* 7) are found on the same plants; this leads us to suspect they are the same insects in a larvæ state, but never having had an opportunity of observing them through their transformations, we are unable to assert any thing definite. We have never noticed them to do any injury.

CETONIA AURATA.

Green Rose Chaffer.—*Plate* 12 *b*, *Figure* 2.

Order, *Coleoptera.* Division, *Cetoniadæ.*

Synonyms.—Scarabæus auratus.—Scarabæus nobilis.—Brass Beetle.—May rose Chaffer.—June Bob.—Green May rose Beetle.

This is one of our handsomest native insects, and in a fine dry season may be found in June either reposing in the heart of the rose blossoms, or flying about the bushes, making a considerable humming noise.

The female burrows into the light soft ground at the foot of the plants, and there deposits her eggs towards the end of June. The grubs, when hatched, are a dirty white colour, without legs, and immediately commence feeding on the roots; how long they live in the larvæ state, we are unable positively to say, but an observing person, some time ago, stated to us two years as the period. When about to enter into the pupæ state, they prepare themselves cocoons composed of earth, pieces of rotten wood, and any substance within reach, which they fasten together with a glutinous secretion.

In the beetle state they live a long time, and are often very prejudicial to the blossoms, cutting off both the petals and stamina. This the Hon. and Rev. —. Wingfield, (who observed them in the

act) informs us they perform very expeditiously, and he is led to judge, from what he has observed, that they do this for the purpose of obtaining the honey from the nectary.

CETONIA STICTICA.

ORDER, *Coleoptera.* DIVISION, *Cetoniadæ*

Synonyms.—Scarabæus sticticus.—Scarabæus Greenii.—Cetonia albo punctata.—White spotted Rose Chaffer.

This species is much smaller than the last, of a similar colour, but with a long white stripe, and two rows of white dots upon each wing case, and is also spotted in a similar manner both upon the head and corslet.

This species is rather scarce, and we have had no opportunity of observing whether it be injurious or not.

MEGACHILE CENTUNCULARIS.

LEAF CUTTING BEE.—*Plate* 12 *b*, *Fig.* 1.

ORDER, *Hymenoptera.* DIVISION, *Apidæ.*

Synonym.—Apis centuncularis.

This bee does no material injury to the plants further than cutting the leaves after the manner shown on plate 12 *a*; this injury to the leaves is done only by the female, at the time of making her nest.

MEGACHILE LIGNISECA.

CARPENTER BEE.

ORDER, *Hymenoptera.* DIVISION, *Apidæ.*

Synonyms.—Anthophora rufiventris.—Apis Ligniseca.—Red-bodied Bee.—Red Carpenter Bee.

This bee is smaller than the "*leaf cutter,*" has a dark head and thorax, and an orange red body, with a black spot on the upper part. The only injury this pretty bee does is, that by perforating the wood for the purpose of forming its nest, the rain sometimes makes its way down to the pith, and causes the branch to die.

ZARÆA FASCIATA.

RED-BODIED ROSE SAW-FLY.—*Plate* 12 *a, Fig.* 4.

ORDER, *Hymenoptera.* DIVISION, *Tenthredinidæ.*

Synonyms.—Emphytus fasciatus.—Tenthredo fasciata.

This saw-fly sometimes causes the whole plants to drop off and die, without any apparent cause. The parent lays her eggs early in June, in the bark of the rose-tree, which she perforates with her long ovipositor. These eggs hatch about the middle of the month, and the small grubs immediately commence eating through the wood until they reach the pith; they then proceed downwards, eating the pith before them until they are full fed, which is early in September; they then leave their places of concealment, and form small brown cocoons on the plants they infest, and the perfect flies appear the following May.

EMPHYTUS NIGRICANS.

BLACK-BODIED ROSE SAW-FLY.

ORDER, *Hymenoptera.* DIVISION, *Tenthredinidæ.*

Synonyms.—Emphytus varipes.—Tenthredo nigricans.

This fly attacks the rose trees much in the same manner as the last, and causes similar injuries. The species is smaller than the Zaræa fasciata, and is without the red ring on the body.

CLADIUS DIFFORMIS.—*Plate* 12 *b, Fig.* 5.

ORDER, *Hymenoptera.* DIVISION, *Tenthredinidæ.*

Synonym.—Tenthredo difformis.

This fly is double brooded, the first flies appearing in May; these lay their eggs, and the caterpillars are full fed by the end of July, and spin themselves small brown cocoons amongst the leaves, tying two or three leaves together, and the perfect insects appear in the middle of August. This brood lay their eggs by the end of the month, which are hatched in a few days, and the caterpillars enter into the pupæ state in October, and become perfect flies the following May.

The larvæ are small, and of a dirty white colour, and may be commonly met with on the China rose, taking shelter on the under side of the leaves, which they perforate through with many small holes.

HYLOTOMA ROSÆ.

ORDER, *Hymenoptera.* DIVISION, *Tenthredinidæ.*

Synonym.—Tenthredo rosæ.

This saw-fly lays its eggs in the young buds early in the season, and the small larvæ perforate the unfolded leaves for their food, and in many cases totally destroy the buds they inhabit.

HYLOTOMA PILICORNIS.

ORDER, *Hymenoptera.* DIVISION, *Tenthredinidæ.*

This species gnaws through the leaves of the China rose, the habits and economy being very similar to those of Cladius difformis.

CYNIPS ROSÆ.

ROSE GALL-FLY.

ORDER, *Hymenoptera.* DIVISION, *Cynipidæ.*

Almost every observing person must have noticed the bushy, crimson-tipped tufts on the common dog rose of our hedges. These, if opened, will be found to contain several small dull white grubs,

Plate 13

Commander in Chief Auriculas

which on being exposed to the air seem scarcely to possess life; these are the larvæ of the Cynips rosæ, or "*Rose Gall-Fly,*" so called from its forming these tufts, or galls. Cultivated roses are rarely punctured by this insect, and even when they are, unless the galls are very numerous, no injury is sustained.

CERCOPIS ROSÆ.

Rose Frog-hopper.

Order, *Homoptera.* Division, *Cercopidæ.*

Synonyms.—Cicada rosæ.—Rose Cuckoo spit.

This insect, although small, often greatly impedes the growth of the rose, towards the end of a dry summer, particularly those trees trained against a wall. The infested trees assume quite a mottled appearance, very similar to that produced by abundance of the red spider, (Acarus telarius.) The perfect insects have very pale red heads and shoulders; light green almost transparent wings, and are remarkably active, leaping and flying with great agility on the approach of any person.

APHIS ROSÆ.

Rose Louse.

Order, *Homotera.* Division, *Aphidæ.*

Synonyms.—Brown rose louse.—Red puceron.

The depredations committed by this insect are so well known, and the insect itself so familiar to every person at all acquainted with rose trees, that any lengthened description would be superfluous.

Besides the brown species there is another green one, both of which are readily destroyed by the same means. If the plants are in a house tobacco smoke will quickly eradicate them, and if in the open borders, a mixture of lime water, soot water, and tobacco water, sprinkled over the bushes, with a rose watering-pot, will answer the same purpose.

Plate 12, *Figure* 8.

This little molluscous animal is very prevalent on the rose in wet seasons, but appears to do little damage. It is probably the "Clausilia bidens; should it ever become sufficiently numerous to create any alarm, a little quick lime sprinkled over the leaves whilst wet, is an effectual remedy.

ALLANTUS VIRIDIS.

Green Rose Saw-Fly.

Order, *Hymenoptera.* Division, *Tenthredinidæ.*

Synonyms.—Tenthredo rosæ.—Ringed Saw-Fly.

The larvæ of this saw-fly we are unacquainted with, but we apprehend it does little or no injury.

ATHALIA ROSÆ.

Buff Rose Fly.

Order, *Hymenoptera.* Division, *Tenthredinidæ.*

The larvæ of this Saw-fly also we are unacquainted with. The perfect insects are very numerous in dry seasons, and may be seen flying very swiftly about the rose bushes in the middle of the day. Perhaps the small brown caterpillars with a black head, which commence an attack on the rose buds about the beginning of May, are the larvæ of this fly. The only method of extirpating these little pests, is to pick them off as often as they are observed, or they will invariably spoil a great number of the flower buds.

DISEASES INCIDENT TO THE ROSE TREE.

Although the rose tree is a free grower, yet it is, in common with many other plants, liable to several kinds of diseases, which may be enumerated as follows:—

1.—DISEASES OF THE ROOTS.

These in general can be traced to one or other of the following causes:—1. Insects, which eat the small fibres, and thereby cut off the means by which the plants derive nourishment; perhaps the worst of this class of insects is the wire worm, of which see the particulars under the head Pink and Carnation.

2. Burrowing of Animals, such as rabbits, hares, &c. &c. by which choice kinds are sometimes a good deal injured.

3. Frost.—This affects only the more tender kinds, sometimes bursting the small vessels, and causing the roots to perish.

4. Drought.—In excessive dry seasons, the roots are deprived of nourishment by the two quick evaporation of moisture, whereby the spongioles become dried up.

5. Over Moisture.—If the situation in which roses are planted be too moist, although the plants may appear to prosper for awhile particularly during the warm weather of summer, yet it will not be long before they begin to stagnate in their growth, and show evident signs of suffering from the vessels being so saturated as to produce rottenness.

6. Soils and Situations.—It must be remembered that any soil containing a large portion of the oxide of copper or other metal, is not good for the growth of any plant. When, however, the soils do not contain any pernicious quality, a disappointment may follow from planting a kind requiring a light and shallow soil, in one deep and rich, or one requiring a shady and dry situation, in in one damp and exposed.

To prevent disappointments of this kind, it is well to take notice of the general habit of each kind, as follows:—

1.—*Evergreen monthly* flowering kinds. These thrive best in

light rich soil with a good dry drainage, and a somewhat warm and sheltered situation.

2.—*Kinds with prickly* slender stems and shoots, roots disposed to spread out, and very fibrous; these require a light dry soil, and the more exposed the situation the better.

3.—*Strong growing* plants, with roots not very fibrous, and not so disposed to grow horizontal as the other kinds; these thrive best in deep, rich soil, and will do in a situation either shaded or exposed.

2.—DISEASES OF THE STEMS.

These may either arise from insects which destroy the foliage, and thus prevent the proper elaboration of the juices,—from injudicious pruning,—or from the growth of parasitical plants upon the leaves.

1.—With respect to the first cause of disease of the stem, both the insects attacking the rose, and the consequent effects, are already treated on at length.

2.—With respect to pruning, the same divisions are requisite to be noticed as in planting.—*First.* The evergreen monthly roses should never have their shoots shortened. When requisite to thin these, cut the superfluous branches quite out.—*Second.* Deciduous kinds, with slender prickly stems and branches, and very fibrous horizontal roots, may be pruned freely with advantage.—*Third.* Strong growing kinds may all be pruned pretty freely, but will not endure it to the same extent as the last.

3.—Parasitical plants growing upon the leaves. These consist of several kinds, as Uredo effusæ, Uredo rosæ, Eurotium rosarum, &c. which constitute what is termed "mildew," and Puccinia rosæ, usually termed the "rust of roses." The two first kinds appear on the leaves as a yellow dust, the Eurotium a white dust, and the puccinia as a red dust. The best remedy for destroying these is to mix a little sulphur along with lime and soot water, and sprinkle it over the leaves.

HINTS ON THE GENERAL CULTURE OF THE ROSE TREE.

Propagation.—This is effected many ways, as by cuttings, layers, suckers, budding, grafting, and seeds.

Cuttings.—Propagation by cuttings is chiefly confined to evergreen kinds; make each cutting from four to six joints long, selecting the young shoots of the same year, when half ripened; cut off each at a joint, take away the two lowest leaves, and plant the cuttings in a mixture of leaf-mould and very light soil, either in pots, or under a hand-glass. If put in during the spring months, a north, or north-eastern aspect is the best; but if in the autumn, a sunny situation is preferable.

Layers.—This can be effected at almost any time, but the best season is in July, just when the plants are in flower; select the young shoots which have become pretty hard, and with a sharp knife make an incision on the upper side, half way through the branch, from just below a bud, and continue the cut half way up to the next above it, place the cut part in the soil, fasten it down with a hooked peg, and cover it over with very light soil.

Suckers.—Nothing more is required in these, than to dig them with as much root as possible, any time during the winter season.

Budding.—Perform this at the end of July, it is preferable to spring, although they will grow at this latter season if a small portion of wood be left with the eye. If standards are required, the stocks must be six feet high, but if dwarfs, six inches to a foot is sufficient. The Dog-rose (Rosa canina) is the best for the purpose. Select a cloudy day for the operation, and take good, plump, and well-formed buds, of the previous year, separating and fixing them as follows:—

Having cut off a shoot containing suitable buds, take it in your left hand, and with your knife make an incision half way through the branch and about half an inch below the bud, and continue the cut to half an inch above it, cut off the leaf attached, and place the bud in your mouth, whilst with a budding knife you cut, in a clean part of the stock, two lines in the shape of the letter T; raise up the bark,

within the upright line, by means of the flat handle of the knife, or a piece of wood cut in the same shape; then with the knife blade separate the wood from the bark and the bud to be inserted; open the bark of the stock, and place the bark containing the bud flat against the wood of the stock, lay the bark of the upright line on the back of the bud, cut off the upper end of the bark attached to the bud, that the edges of the bark of the stock and the bud may exactly meet; wrap it round securely, both above and below the bud, with well soaked matting, and the operation is ended.

In separating the wood from the bark containing the bud, care is requisite that the heart of the bud be not carried away with it; this may be easily known by a small hole being observable; another bud is then necessary.

Grafting.—When large heads or standards are required quickly, grafting by approach is often resorted to with success; cut off the stocks to the desired height, and slope off two or three inches of the bark with a thin portion of the wood; prepare the stem of the plant intended to engraft in a similar manner, and fit the two nicely together; tie them well with soft bass matting, or lay on a little prepared clay to keep out the wet and drought. In independent grafting, the scions are fitted in a precisely similar manner.

Seeds.—Propagation by seeds is only practiced when new sorts are required. Gather the *hips* when perfectly ripe, separate the seeds from them, and either sow them in boxes filled with very light soil, (and sheltered in winter,) or on a prepared bed.

Pruning.—In February cut out the old and useless wood, and shorten the young shoots of the preceding year to two or three eyes, according to their strength.

Forcing.—The best kinds for forcing are the red, white, and moss Provences, the Tuscany, and the Damask roses.

The plants may be brought into the forcing house any time from November till March, according to the season when the flowers are required.

If they are brought in at different times, it is advisable to mark them accordingly, as the following season they will show signs of growth at the same time they were introduced the previous year.

Whilst in a state of growth, water them two or three times a week with liquid manure.

After they have done flowering, do not turn them into the open air until the wood begins to ripen.

THE LILAC TREE.—*(Syringa.)*

This being a robust growing shrub, never suffers from the ravages of insects. We may just mention, however, a few of those most commonly found upon it.

GRACILLARIA ANASTOMOSIS.

LILAC SLENDER MOTH.—*Frontispiece, Fig. 5.*

ORDER, *Lepidoptera.* DIVISION, *Tineidæ.*

Synonyms.—Tinea syringella.—The Confluent barred.

This little creature is double brooded; the first brood of moths appear on the wing in May, from the larvæ of the previous autumn, and the second appear in July.

The eggs are laid in rows, consisting of from three to a dozen, and are placed chiefly along the nervures, on the under side of the leaves.

In five or six days the eggs are hatched, and the larvæ eat into the leaves, mining to the upper surface, where they feed upon the parenchyma, leaving the epidermis, or outer skin, untouched.

After they have fed in this way for about a fortnight, they leave these mines, and commence rolling the leaves. The roll is fastened on the outside with a few threads, and the ends are drawn close.

Within this habitation they remain until they are full grown, eating only half the substance of the leaf; they then let themselves down from the leaves by means of fine threads, and retire beneath the ground, where they spin strong cocoons, and in a few days change into pupæ.

It is principally on trees planted in shady situations, and on the under branches, that this little moth lays her eggs.

The size of the moth, when the wings are expanded, is something less than half an inch. See the flying figure on the frontispiece.

First pair of wings ashy grey, with five or six strong, brownish red, irregular bands.—*Second pair* pale black, all surrounded by long tawny-brown fringe.

Caterpillar yellow-green, with a brown head, about a quarter of an inch long.

Chrysalis reddish brown, and shining, covered with a hairy case.

A small saw-fly of the Ichneumon tribe, called the Alomya stercorator, lays its eggs in the body of this caterpillar.

PERICALLIA SYRINGARIA.

Lilac Beauty Moth.

Order, *Lepidoptera.* Division, *Geometridæ.*

Synonyms.—Phalæna syringaria.—Geometra syringaria.—Richmond beauty.

This is another very beautiful moth, which feeds upon the leaves. It is only single brooded. The caterpillars appear about the middle or end of July, seldom in large quantities. They continue feeding until the end of September, when they go into the pupæ state; and the perfect moth appears the following June.

The wings of the moth are nearly two inches across when expanded. *First pair* yellowish-grey, marked with three brownish violet blotches.—*Second pair* dull grey, with a few black spots towards the edge.

Caterpillar dark brown, spotted with black, and a black head.

Chrysalis brown, thick, and rather short.

SPHINX LIGUSTRI.

Privet Hawk Moth.

Order, *Lepidoptera Crepuscularia.* Division, *Sphingidæ.*

This fine moth measures, when the wings are expanded, from three and a half to four inches. The *first pair* are yellowish-grey, slightly mixed with pink, and shaded with pale black; the lower part dull brown, with two white irregular lines. *Second pair* yellow ground, shaded with rose colour, with two broad and one narrow

Plate 14.

black bands. All the wings are surrounded with a dull red fringe. *Body* rosy-purple, with black bands, and a pale yellow-brown band extending the whole length.

Caterpillar bright yellow-green, with seven oblique purple stripes on each side of the body, and a horn near its extremity. It feeds on both the lilac and privet until July, when it goes into the pupæ state, burying itself in the ground, and the perfect moth appears in August.

INSECTS ON THE HONEYSUCKLE.

These kind of plants are rarely injured by any insects except the Aphis, which sometimes attack the climbing species when trained against walls, and greatly disfigure them. There are two kinds of these sap-suckers attack them in such situations. The same species which preys on the rose, (Aphis rosæ,) and another peculiar to the various species of honeysuckle; this is called,—

ERIOSOMA XYLOSTEI.

HONEYSUCKLE APHIS.

ORDER, *Homoptera.* DIVISION, *Aphidæ.*

Synonyms.—Aphis xylosteum.—Honeysuckle fly.

This species may be destroyed in the same manner as the Aphis rosæ, namely, by sprinkling the infested plant with weak tobacco water, or a mixture of lime water, soot water, and tobacco water, mixed, provided they have become very numerous.

LOBOPHORA DENTISTRIGATA.

TOOTH-STRIPED HONEYSUCKLE MOTH.

ORDER, *Lepidoptera Nocturna.* DIVISION, *Geometridæ.*

Synonyms.—Early Tooth-striped.—Geometra lobulata.—Phalæna dentistrigata.

This species is double brooded. The first family of caterpillars appear early in May, and are full fed by the end of June, they then go into pupæ, and the moths are on the wing about the end of July. The second brood commence feeding early in August, and are full fed by the end of September, and the perfect moths appear about the end of the following April, and sometimes, if the weather be fine, they are seen somewhat earlier.

The wings measure, when expanded, about an inch and a quarter. *First pair* yellowish grey, having several wavy pale black streaks across them. *Second pair* paler, with several very pale waves across.

Caterpillar reddish brown, with a dull greenish back, and a longitudinal pale line on the sides, measuring, when full grown, about an inch long.

Chrysalis brown, secured in a strong brown cocoon.

LOBOPHORA POLYCOMMATA.

Honeysuckle Lobe Moth.

Order, *Lepidoptera Nocturna.* Division, *Geometridæ.*

The caterpillars of this little moth appear in May, and begin their depredations at the extremities of the branches, tying the young leaves together, and eating the leading buds. They continue feeding until the end of August, and then descending into the ground, form a brown cocoon, and the perfect moths appear the following April.

In some seasons this pretty insect is remarkably scarce; in others it may be met with plentifully, but in no case have we observed them sufficiently numerous to do any injury.

The wings measure, when expanded, about an inch; the *first pair* are yellowish grey, with a very irregular dark band, and several dusky spots. *Second pair,* spotless.

Caterpillar dull green, with a yellowish-white line on each side, and brown spots on each segment.

Chrysalis, brown and shining, enclosed in a cocoon.

YPSOLAPHUS XYLOSTELLA.

COMMON HONEYSUCKLE MOTH.

ORDER, *Lepidoptera Nocturna.* DIVISION, *Tineidæ.*

Synonyms.— Tinea Xylostella.—Grey Honeysuckle Moth.

This is a very small creature, scarcely exceeding half an inch in the expansion of the wings. The colour of the wings is grey and shining, like silver. In some seasons this species of moth is met with in abundance, usually about the end of May, just in the dusk of the evening. We are not acquainted with the caterpillar, unless it be a small brown one, occasionally found on the honeysuckle, which, when discovered, dexterously escapes by spinning a thread, and letting itself suddenly to the ground by it. The plants have never been injured by them, as far as our observations have gone, to warrant our using means for their destruction.

ALUCITA HEXADACTYLA.

TWENTY-PLUMED MOTH.—*Frontispiece, Fig.* 4.

ORDER, *Lepidoptera Nocturna.* DIVISION, *Alucitidæ.*

Synonyms.—Common-feathered Moth.—Many-plumed Moth.—Six-cleft-plume Moth.—Many-feathered Moth.

This is a very common moth, and a very singular one. The wings measure, when expanded, about half an inch : they are pale yellow. *First pair,* divided into eight rays each, exactly resembling feathers ; *second pair* divided into four, making twenty-four distinct feathers, all beautifully and singularly fringed. There are numerous wavy black streaks pass over the whole wings at measured distances, which greatly add to their beauty.

The *caterpillars* are found plentifully in May, on the under side of the leaves of the various species of honeysuckle, particularly those trained against walls, but the injury they do is trifling.

LIMENITIS CAMILLA.

HONEYSUCKLE BUTTERFLY.

ORDER, *Lepidoptera Diurna.* DIVISION, *Nymphalidæ.*

Synonyms.—White Admirable.—Papilio Camilla.—White Admiral.

This butterfly measures, in the expansion of the wings, about an inch and three-quarters,—all four dull black on the upper side, with a broad white band reaching across them both, having also on the upper pair five white spots, under side yellow, tinged with red, and spotted with silvery white.

Although this insect is stated to feed on the honeysuckle, we have never yet met with the larva, nor do we apprehend the perfect butterfly is extensively distributed; in the North of either England or Ireland we never caught a single specimen.

MACROGLOSSA STELLATARUM.

HUMMING-BIRD HAWK MOTH.—*Frontispiece, Fig.* 2.

ORDER, *Lepidoptera Crespuscularia.* DIVISION, *Sesiidæ.*

Synonyms.—Sphinx stellatarum.—Humming-bird Sphinx.

This singular moth measures about an inch and three quarters when the wings are expanded. *First pair* dark brown, with three somewhat irregular cross bars, and a nearly black dot about the centre of each wing. *Second pair* orange yellow. *Body* the same colour as the upper wings, with tufts of black and white hairs terminating every segment.

This moth has an extremely long sucker, which it inserts into the tubes of the honeysuckle flowers, poising itself at the same time on the wing; and, when disturbed, has a motion so quick, and attended with so considerable a humming noise, that the name of "Humming-bird Hawk Moth" is not inaptly given.

Caterpillar green, spotted with white, and two white lines on each side; the horn is straight, whitish at the tip, and bluish-brown

at the base. We do not conceive it feeds upon the honeysuckle, as we never found it upon this plant; but we have introduced it here, because the perfect moth is in the habit of frequenting the honeysuckle.

SESIA FUCIFORMIS.

Bee-fly Hawk Moth.—*Frontispiece, Fig.* 3.

Order, *Lepidoptera Crepuscularia.* Division, *Sesiidæ.*

Synonyms.—Sphinx fuciformis.—Sesia bombyliformis.—Broad-bordered Bee Hawk Moth.—Clear-winged humming-bird Hawk Moth.

The wings of this moth measure, when expanded, about an inch and a quarter. They are transparent, tinged with blue, having brown nerves, and a broad brown margin.

Caterpillar light green, tinged with red under the body.

INSECTS FOUND UPON THE VERBASCUM.

Two kinds of Moth are found upon the species of Verbaseum, but as the plants are of strong rampant growth, the injuries inflicted upon them are trivial.

CUCULLIA SCROPHULARIA.

Water Betony Moth.

Order, *Lepidoptera Nocturna.* Division, *Noctuidæ.*

Synonyms.—Water Betony Likeness.—Phalæna Verbasci.—Noctua scrophulariæ.

This moth is double brooded, the first appearing early in May, from the larva of the previous autumn, and the second in September, from the eggs laid by the moths in Spring.

The wings measure, when expanded, something more than an inch and a half. *First pair* dull yellow, becoming brown towards

the margins, and having upon each a pale mark, not unlike a figure 3. *Second pair* dull white.

Caterpillar very pale green, with broad very pale yellow bands, and black spots.

Pupæ inclosed in a brown case.

CUCULLIA VERBASCI.

Mullein Moth.

Order, *Lepidoptera Nocturna.* Division, *Noctuidæ.*

Synonyms.—Noctua Verbasci.—Phalæna Verbasci.—Water Betony Sword Grass.

In some seasons this moth is very numerous, generally appearing about the end of April, or beginning of May. The wings, when expanded, measure about an inch and three quarters. *First pair* brown, with dull black margins; near to the lower edge is a white mark, resembling this sign ϵ. *Second pair* dull white, with a dark border.

The *Caterpillars* (Plate 13, fig 4,) are very voracious, and will eat each other as readily as they would the leaves of the plants. When full grown they are about an inch and a quarter long, and a leaden ash colour, having interrupted yellow bands, spotted with black. They continue feeding until the end of September, when they go into the pupæ state, burying themselves in the ground, and forming a strong brown cocoon, and the perfect moths appear the following May.

INSECTS INFESTING THE GENUS PRIMULA;

Including the various kinds of Auricula, Polyanthus, *and* Primrose.

All the various species and varieties of Primula are subject to the attacks of slugs, earwigs, and the caterpillars of various species of moths, which may be described as follows:—

TRIPHÆNA PRONUBA.

BRIDE'S MAID MOTH.—*Plate,* 13, *Fig.*1.

ORDER, *Lepidoptera Nocturna.* DIVISION, *Noctuidæ.*

Synonyms.—Noctua pronuba.—Phalæna pronuba.—Great yellow underwing Moth.

The wings of this moth are two inches and a quarter expansion. *First pair* grey, deeply clouded with reddish brown. *Second pair* yellow orange, with a broad black band near the lower margin. This in most seasons is a very common insect.

The *caterpillar* is a dull brownish green, marked with two rows of black spots down the back. The parent lays her eggs about the beginning of August, and the caterpillars commence their ravages just above the surface of the soil, feeding only in the night, and retiring beneath the earth in the day. In winter they become partially torpid, and may be found coiled up beneath the shelter of large stones, or under rubbish, but as the spring advances they again commence their ravages, and towards the end of April are full fed; they then form a cocoon beneath the soil, and become pupæ, and the following June the perfect moths emerge.

CIDARIA IMPLICARIA.

SILVER GROUND MOTH.

ORDER, *Lepidoptera Nocturna.* DIVISION, *Geometridæ.*

Synonyms.—Cidaria montanaria.—Geometra montanata—Geometra implicaria.

This is quite a common insect, and attacks both the auricula, polyanthus, and primrose. The caterpillars generally creep down into the heart of the plant they attack, and there forming a web, they reside and feed on the embryo leaves and flowers.

They commence their depredations early in July, and continue feeding until September or October, when they become pupæ, and the perfect moths appear the following June. When full grown,

the caterpillars measure rather more than half an inch in length, are of a brownish green colour, with a row of white spots on each side.

The wings of the moth, when expanded, measure rather more than one inch. *First pair* dull white, with several small dark spots, and two very irregular dark bands.

GRAPHIPHORA FESTIVA.

Primrose Moth.

Order, *Lepidoptera Nocturna.* Division, *Noctuidæ.*

Synonyms.—Noctua primulæ.—Noctua festiva.—Red Clay Moth.

In some seasons this is a very plentiful moth, in others scarcely any are to be met with. The wings measure, when expanded, rather more than an inch and a quarter. *First pair* pale brown, mixed with grey, and having four dark brown angular spots. *Second pair* pale grey, shining, with a faint dusky spot in the centre of each.

The parent lays her eggs about the end of July, and the small caterpillars commence their depredations much after the manner of the Genus Triphæna. On the approach of winter they bury themselves a sufficient depth to be secure from either the severity of the weather, or their natural enemies; and there they remain in a state of partial torpidity until the following spring, when they again commence feeding, and are full fed by the end of May, or beginning of June, they then go into the pupæ state, and the perfect moths appear in July.

The caterpillars, when full grown, are about an inch long, of a dull greenish yellow colour, with a pale yellow line down the back, and a dark line on each side.

XYLOPHASIA RUREA.

Dark Tawny Moth.

Order, *Lepidoptera Nocturna.* Division, *Noctuidæ.*

Synonyms.—Noctua rurea.—Noctua alopecurus.—Noctua combusta.—Liver Moth.

The *caterpillar* of this pretty moth is said to feed upon the primrose, but we apprehend it chiefly confines its depredations to the wild species in the woods, as only one specimen, and that in the perfect state, has been met with by us. The usual time of appearance is in July. Of the habits and colour of the caterpillar we are unable to state any thing satisfactory.

The wings of the moth measure, when expanded, about an inch and a half. *First pair* pale grey, shaded with reddish brown, with a large dark brown spot on the upper edge, a line of small brown spots extends from the base to the inner margin of each wing, and another broken and irregular one of similar dots on the margin itself. *Second pair* pale blackish brown, with a black marginal line, and a pale fringe.

ARGYROMIGES SYLVELLA.

DARK PORCELAIN MOTH.—*Frontispiece, Fig.* 6.

ORDER, *Lepidoptera Nocturna.* DIVISION, *Yponomeutidæ.*

Synonyms.—Metallic-marked Moth.—Tinea Sylvella.

The little greenish white caterpillar, so commonly observed on the leaves of the primrose and polyanthus, forming its singular mines, (see plate 13, fig. 3,) is probably the Argyromiges sylvella. It makes its excavations much after the manner of those on the rose, with this difference, however, that the path is not formed in so tortuous a manner, and is more confined to the mid rib of the leaf.

CULTURE OF THE POLYANTHUS.

The polyanthus is sufficiently hardy to endure the frost of our winters without injury, but is liable to be injured by excessive wet. Unless the air be pure, the plants never flourish.

PROPAGATION.—This is effected both by seeds and offsets.

Seeds.—Select the best kinds for producing seeds. As soon as ripe, gather, and sow immediately in very light soil.

Offsets.—March and April are the proper months for removing the offsets.

All the best sorts should be grown in pots; they can then be sheltered from wet during the winter season, but if this is not convenient, plant the offsets on a shady border.

Soil.—The best soil is one-fourth leaf-mould, one-fourth rotten cow-dung, and one-half rich light maiden soil.

Potting.—In every potting drain well, water freely as soon as potted, set them in a shady situation, and there let them remain until they have grown considerably—water very sparingly until they begin to start their roots.

The proper time for potting the old plants is immediately after they have done flowering; always break off the old carrot stump in preference to cutting it with a knife.

Sheltering in Winter.—About the middle of October the kinds grown in pots should be placed in a frame, or pit, and there sheltered from wet until the end of March.

Top-dressing.—This should be performed twice in the year, viz.—October, when the plants are placed in the frame; and about the middle of February, to assist them to flower finely.

Air.—As the chief design in sheltering is to preserve the plants from over moisture during torpidity, it must be observed, that the less pure air is obstructed the better.

Thinning out the Buds.—When the flower buds are formed, cut out all the small ones, leaving from six to ten to expand.

Shading the Flowers.—As the flowers proceed towards expansion, neither allow them to be exposed to wet, nor direct sunshine.

CULTURE OF THE AURICULA.

Propagation of the auricula is effected by both seeds and offsets.—Sow the seeds as soon as ripe, and separate the offsets at the same time as the polyanthuses.

Soil.—The same soil as recommended for the polyanthus, and

a little bone dust mixed with it, is all that is necessary to grow auriculas to perfection.

Top-dressing.—Take off about an inch depth of the old soil, and add some of the above in its place twice in the year, viz.—early in February, and in September.

Potting.—Perform this immediately after the flowers have fallen; drain well with broken crocks; do not disturb the ball more than is necessary to break off the carrot root and loosen the fibres, unless the roots are decayed; separate the decayed parts by breaking them off, or scooping out with the finger, but never use a knife. A good sized plant will require a pot nine inches wide at the top, and ten inches deep. Delay potting plants intended to produce seed until after the seed is ripe.

Sheltering.—From the middle of September to the end of April shelter auriculas in a frame which can be covered with wooden shutters, and set the pots on a little stage, in preference to placing them on the ground.

Air.—Auriculas cannot receive too much pure air, for although they are better sheltered in a frame, the design is only to protect them from dashing rains and severe frosts, which would injure the flower buds.

Watering.—In December and January keep the soil rather dry. In February and March water once or twice a week with the liquid manure, and as the flower stems advance, allow the plants now and then the benefit of gentle rains. Give plenty of water at the roots when the flowers begin to expand, but allow no water to fall on the buds, or the colours will run. Never at any time allow choice kinds to be exposed to heavy dashing rains.

Shading Flowers.—If the flower buds are exposed to the full influence of the sun, the colours will be faded. To obviate this, fix a small board on the top of a stick, and fix the stick in the ground, so that the board will shelter the truss of flowers from the mid-day sun, but allow that of the morning and evening to shine upon it; this is the more requisite, as the plants require full exposure to the air. These precautions are only necessary for those intended to be shown, or grown to perfection.

Thinning Buds.—Cut out all the small and inside buds, as

recommended for the polyanthus, leaving only from six to ten, according to the kind.

Removing dead Leaves.—Never remove any leaves before they are thoroughly dead, for if this is done a wound is occasioned, which absorbs too much water, and causes the plant to rot. If any part is so injured, scratch out the rotted part with the finger, and fill the wound with quick lime, and it will soon heal.

INSECTS AND OTHER ANIMALS INJURIOUS TO THE GENUS DIANTHUS;

Particularly the Pink *and* Carnation.

The Pink and Carnation are subject to the attacks of many enemies, as the Earwig, Wireworm, Slug, Snail, Grub, Aphis, and a small species of Thrips, which destroys the colour of the petals; also, the plants often fall a prey to the depredations of Hares and Rabbits, which have a peculiar liking to them.

If we place the above enemies in rotation, according to their destructiveness, the hare and rabbit undoubtedly rank *first; next* the grub, which bites off the plant immediately at its junction with the root; *third,* the wireworm which perforates the root through and through, until the plants die in consequence; *fourth,* the slug and snail, which in the course of a night will eat off the flower stem, nearly strip a plant of its leaves, and sometimes will bite of the whole plant from the root; *fifth,* the earwig, which will secrete itself in the calyx, and bite off the petals at the lower end or claws, thereby causing them to fall out, and greatly disfigure the flower, and, *lastly,* the thrips, which spoils the markings on the petals.

To put a stop to the depredations of the first,—a good fence would be of benefit, but if the situation would not allow of this, then nothing is better than a good gun.

HEMIRHIPUS OBSCURUS.

COMMON WIRE WORM BEETLE.—*Plate* 14, *lowest left hand Figs.*

ORDER, *Coleoptera.* DIVISION, *Elateridæ.*

Synonyms.—Elater obscurus.—Elater variabilis.—Elater obtusus.—Brown click Beetle.—Brown Ship-jack.

The larvæ of this beetle are the well known wire-worms. They are said to continue in the larvæ state five years, during which time, they feed on the roots of almost every garden plant. They usually attack the pink and carnation in the upper part of the roots, and perforate them through and through. They are the most prevalent in new-made gardens with light sandy soils, particularly in dry seasons; sometimes destroying nearly all before them. In the garden at Narrow Water, where the soil has been in crop for many years, these insects are very prevalent, scarcely any plant escaping their depredations.

Many means have been adopted to eradicate these little pests, and some have proved successful; kelp or sea weed spread thick on the ground, and dug in, will, in a great degree, prevent their depredations for that season; but the best way appears to be that of alluring them by baits of different kinds. This was first suggested by Sir Joseph Banks, and has now become pretty generally adopted. The plan is this:—

When the insects abound, bury at about an inch under the the ground, slices of apples, parsnips, carrots, or potatoes, sticking in each slice a small wooden skewer, to take it easily out of the soil, and also to mark the spot where the bait is buried.

Examine the baits every day, or at furthest every other day, and kill the insects collected on them. Some gardeners prefer sliced beet-root, cabbage stumps, or young lettuce plants; whatever is used, there must be no neglect in examining and destroying the worms on them.

FORFICULA AURICULARIA.

COMMON EARWIG.—*Plate* 14, *middle Fig. right hand.*

ORDER, *Dermaptera.* DIVISION, *Forficulidæ.*

Synonyms.—Forficula major.—Battletwig of many Gardeners.

This insect is so well known, that any particular description of it would be superfluous. It is very injurious, and attacks not only the pink and carnation, but the dahlia, and most other flowers, generally creeping down into the calyx, and biting off the petals at the claws, so that if any of the petals hang loose, or fall out, you may be certain that an earwig has been, or is still secreted there.

The earwig undergoes very little change, either as it respects activity or general appearance, from the time of its exclusion from the egg unto its last, or perfect stage. All its depredations are committed during its larvæ state, which is that in which it generally comes under our observation. At first when it issues from the egg it is very small, and of a pale colour, but as it increases in size it becomes brown, and changes its skin; this it does several times, until at length it becomes possessed of a fine pair of slender glossy transparent wings, which, when not in use, it has the power of folding in a small compass, and secreting beneath its short and hard cases, at the lower part of its shoulders. In the winged state it lives but a short time.

TO DESTROY THE EARWIG.—The only way of destroying this insect is, to allure it to take shelter in some hollow substance, placed as a decoy, and by examining these traps every morning, and killing those secreted in them, their numbers become considerably lessened.

Tobacco-pipe Heads, free from the smell of tobacco, placed on the top of the stick which supports the flower, has been found to answer very well.

Lobsters' claws are thought by some to surpass every thing else to entice them.

Coarse Paper coiled round, pinned at the top, and stuck on the top of the flower stake, is found a good decoy.

Bean Stalks, cut into lengths of about 6 inches, are perhaps the best decoy of all, and if stuck plentifully about the plants, and some laid on the ground, they will not fail to attract very many insects. Whatever is used, it is necessary that they be carefully examined every morning, and the earwigs destroyed.

APHIS LYCHNIDIS.

LYCHNIS, or CARNATION LOUSE.—*Plate* 14, *Figures on the left-hand bud.*

ORDER, *Homoptera.* DIVISION, *Aphidæ.*

This insect, in dry seasons, often becomes very numerous, and is then hurtful to the plants. They usually attack the youngest leaves and flower buds, often causing the flower stem to become tortuous. They may be readily destroyed by sprinkling the infested parts with weak tobacco water, or by scattering a little scotch snuff upon the insects themselves, early in a morning, when the plants are covered with dew.

THRIPS MINUTISSIMA.

SMALLEST THRIPS.

ORDER, *Homoptera.* DIVISION, *Thripidæ.*

This small insect destroys the colour of the petals. The only way of preserving the flowers from injury, is to brush the insects off with a camel-hair pencil, as soon as they are perceived; for applying any liquid, would do nearly as much injury to the flower as the insects themselves.

GREY GRUB.—*Plate* 14, *lower Fig. right hand corner.*

This grub is probably the larvæ of some beetle; it measures about an inch long, is without feet, and has a very tough skin. It

generally lies about about an inch beneath the surface, and bites off the plants just above the roots. We are not acquainted with any ready means of destroying it; but if any plant falls over, remove the soil contiguous and destroy the grub.

The common Slug, (Limax agrestis); the white Slug, (Limax alba); the grey Slug, (Limax ater); and the small black Slug, (Limax hyalinus, Plate 14); also the Snail, (Helix hortensis) are often generally destructive. A little quick-lime scattered about the ground where the plants grow, will prevent their attacks. If the plants are grown in pots, get a large saucer, or feeder, and place a brick in the centre and fill up the saucer with water; if the pot be then placed on the brick, neither Earwig, Snail, or Slug will venture across.

HINTS ON THE CULTURE OF THE CARNATION.

1. Propagation.—This is effected by layers, pipings, and seeds.

Layers.—This should be performed in the middle of August, just when the flowers are beginning to fade. Select the shoots to be layed, and prepare them by cutting off the lower leaves; then make an incision with a sharp knife, just below a joint, and continue the slit upwards, for three quarters of an inch; press the layer carefully into the mould, and secure it with a hooked peg.

Pipings.—This system is not to be depended upon, but some kinds grow more freely than others; they grow the best upon a slight hot-bed, covered with finely sifted leaf mould, cut them from the parent plant with not less than three joints, cut off the lower leaves, and plant them about an inch apart and about an inch deep; give a sprinkling of water, cover down with glasses, and shade from the hot sun until they are struck.

Seeds.—Gather the seeds when ripe, and preserve them in the capsules until spring. In May sow them in pots or pans of very light soil, place the pots in any situation where they can be sheltered from strong sunshine and heavy rains; water with care until the plants appear; as soon as they have formed five or six leaves,

Jasminum Wallichianum

S. H. Delt

Wm Miller Sculpt Edin

plant them out into a bed made of light rich soil; and if the following winter is very severe, shelter them with hoops and mats.

2. Soil.—Whether they are grown in pots or in a bed, it is necessary to make the compost for them pretty good, say one-half rich light loam, and one-half very rotten dung. If the soil be at all heavy, add a little sand to allow the wet a free passage.

3. Planting out.—By whatever means the plants are propagated, when the pipings or layers are well struck, they must be either planted in beds or pots. If the former, it is necessary to dig out the old soil to a sufficient depth to allow room for the growth of their roots, and fill up with the above rich compost; trample it pretty close together, as this prevents the too luxuriant growth of the plants, which sometimes occasions premature death.

4. Growing in Pots.—When the layers and pipings have struck root, plant them two or three in a 48-sized pot, and place them in a situation in the garden where they can be sheltered if needful from very dashing rains. In October place them in a frame, and allow them to remain there until spring, giving them as much air as possible. In March, turn out the balls entire from the small pots, and place each in a pot about ten inches wide and twelve deep, filled with the above compost.

5. Top-dressing.—All those grown in pots will require top-dressing, with equal parts of leaf-mould and sheep's dung, about the beginning of June; this greatly assists their growth, and gives a greater brilliancy to the flowers.

6. Thinning Flower Buds.—As soon as the buds are all formed, thin out all the small ones, leaving no more than eight or ten to perfect themselves.

7. Bursting of Flower Buds.—It often happens that just when the flower buds are about to expand, one side bursts, and the shape of the flower is thus destroyed; to prevent this tie a bit of thread round the middle of the calyx, just when it is ready to open, and it will cause it to open regularly.

8. When in full flower shelter from sun and rain, or the colours will run.

HINTS ON THE CULTURE OF THE PINK.

1. Propagation.—This is generally effected by pipings and seeds.

Pipings are put in about the middle or end of June, never later than the first week in July; having prepared them as for Carnations, plant them under hand-glasses in a shady part of the garden.

2. Soil.—A mixture of one-half good rich loam, and one-half well rotted cow-dung. Take out the old soil from the bed intended to be planted, eighteen inches deep, and fill up with the above.

3. The Season for Planting in the beds is September, for if not put out till Spring they do not flower in perfection. For good success it is indispensable that the plants be young.

INSECTS INFESTING MIGNONETTE.

This fragrant plant is much infested by one or two species of white butterflies. The first we may name, is—

PONTIA BRASSICÆ CHARICLEA.

Early Cabbage Butterfly.

Order, *Lepidoptera Diurna.* Division, *Papilionidæ.*

The name of "early" is attached to this insect, from its appearing in its perfect form somewhat earlier than any other of the same tribe. If it is not the same species as P. Brassicæ, it probably can scarcely be considered more than a variety. All the other species of Pontia make this plant occasionally their food. The caterpillars may be easily destroyed, by pouring water upon a quantity of unslaked lime, and allowing it to stand an hour to settle, then water the Mignonette with the clear liquor.

PONTIA RAPÆ.

SMALL WHITE BUTTERFLY.—*Plate* 13, *Fig.* 2.

ORDER, *Lepidoptera Diurna.* DIVISION, *Papilionidæ.*

This butterfly greatly resembles the *Brassicæ chariclea* in appearance, but is much smaller, rarely exceeding two inches in the expansion of the wings. The caterpillar (plate 13, fig. 2,) is a very rich green, with a yellow line on each side. If it ever becomes injurious, destroy it in the same way as the last.

HYLÆUS DILATATUS.—*Plate* 13, *Fig.* 5.

ORDER, *Hymenoptera.* DIVISION, *Andrenidæ.*

This small bee is very common on the flowers, but whether to collect honey, or for other purposes, we are unable to say.

HINTS ON THE CULTURE OF MIGNONETTE.

SOWING IN THE BORDERS may be done any time in March, after the manner of the common Annuals.

SOWING IN POTS.—If for blooming in January or February, sow in the second week in August—and the first week in September. These sowings are liable to damp off. Place the pots on a slight hotbed, as near the glass as you can; drain well; water with care; give plenty of air when the plants are up; thin them out to ten or twelve in a pot; and when about an inch high, stop the leading shoots to cause them to spread.

If for blooming in May, sow in the first or second week in February, place the pots in a frame as the last, allow them plenty of air, and occasionally showers of rain when not too heavy.

If for blooming in August, sow early in April; place the pots in any warm situation out of doors, water when necessary, keep free from weeds, and nothing more is required.

If for blooming in November, sow about the middle of July, plunge the pots up to the rim in the ground, and when cold weather commences place them in a frame, or other sheltered situation for the winter.

Size of Pots.—The best size for all the sowings, is upright 48's. See page 153.

Tree Mignonette.—To form the tree Mignonette, nothing more is required than to select some pots of the February sowing, take out all the plants except the one intended to be trained, as it advances in growth tie it to a small stick, stop all the side shoots as soon as they appear, but preserve all the leaves entire; when it has reached the desired height, prevent it from flowering until it has formed a good head, and in the autumn it will make a very pretty appearance.

Soil.—A mixture of one half light sandy maiden loam, one fourth sifted leaf mould, and one fourth sand.

INSECTS INFESTING THE NARCISSUS.

The bulbs of this genus being strong growers, are rarely injured by any insects, In dry seasons, however, they are fed upon by a small white grub; this is the larvæ of a small two-winged fly, the—

CRIORHINA NARCISSI.

Narcissus Fly.

Order, *Diptera.* Division, *Syrphidæ.*

Synonym.—Merodon Narcissi.

In wet seasons this fly is very scarce, but in dry weather the parent lays her eggs early in the Spring; the grubs are dull yellowish white, about a quarter of an inch long, with a brownish head.

INSECTS INFESTING THE JASMINE.

This favonrite plant very rarely suffers from the attacks of insects. Occasionlly, however, when trained against a wall, it becomes

infested with aphis, and sometimes in the open garden, by the large caterpillar of the—

ACHERONTIA ATROPOS.

Death's Head Hawk Moth.—*Plate* 15.

Order, *Lepidoptera Crepuscularia.* Division, *Sphingidæ.*

Synonyms.—Phantom Moth.—Jasmine Moth.—Bee Tiger Moth.—Sphinx Atropos.

This splendid moth is not very common, but is of more frequent occurrence in Ireland than England. This may perhaps arise from the more extensive cultivation of the potatoe in the former country, as, although the caterpillar is occasionally met with upon the Jasmine, its favourite food is the young tops of the potatoe.

It is probably the largest species of moth indigenous to the British Isles. The wings, when expanded, measure from five to six inches. *First pair* ash coloured, deeply shaded with rich deep brown, and having two wavy black lines, and several dusky streaks on each. *Second pair,* bright yellow, with two black wavy lines, and a broad dusky border. *Head* and *Shoulders* black, the latter having on its surface the rough shape of a man's face, whence it has its common name. *Body,* deep and rich orange, with black bands, and a broad black streak the whole length of the body.

Caterpillar, four or five inches long, pale yellow, spotted on the back with bluish-green spots, and having seven or eight oblique bluish-green bands on each side.

Chrysalis, deep brown, shining, about two inches long, and inclosed in a strong, deep brown, or nearly black, cocoon.

A few REMARKS on the JASMINUM WALLICHIANUM.

Plate 15.

This plant is a native of Nipal, from whence seeds were brought about eight or nine years ago. It is hardy, bears a great resemblance to J. revolutum, but is less showy, the flowers being small. It was named in compliment to Dr. Wallich of Calcutta, whose extensive labours on the Flora of India, cannot be too highly appreciated.

INSECTS INFESTING TULIPS.

This esteemed flower, in some seasons, suffers from the attacks of a small fly which lays its eggs in the roots. This is called the—

BIBIO HORTULANUS.

TULIP CRANE-FLY.

ORDER, *Diptera*. DIVISION, *Tipulidæ*.

The grub of this fly attacks the roots much in the same manner as those on the Narcissus, feeding in company inside the bulbs. Their attacks may be perceived by the discolouring of the leaves, and in the end by the final perishing of the bulb.

HINTS ON THE CULTURE OF THE TULIP.

FLOWERING BEDS.—Select an open situation, dig out the soil eighteen inches deep, and fill the bed six inches above the level of the ground with good maiden loam, mixed with one-fourth very rotten horse dung.

PLANTING BULBS.—Plant in November, in rows lengthwise on the bed, 6 inches apart, and the same distance betwixt root and root, and about four inches deep, putting a little clean sharp sand in each hole.

SHELTERING.—When the flower buds are formed, shelter from storms of rain, hail, or frost, but the covering must be removed when the storms are over, or the plants will grow weakly; when, however, the flowers assume their colours, the covering must be kept upon them for the most part, as either sun or rain would spoil the colours.

TAKING UP.—When the flowers are over, expose the plants fully to the light, break off the flower stems of all except those to produce seeds; and when the foliage is withered take up the bulbs,

dry them by spreading them on a dry floor, then pack them in paper bags until the following November.

Offsets are separated at the time of taking up; plant all small ones the following November in a bed by themselves.

Seeds should be gathered from the best kinds. Sow them in pans or boxes in October, and let the small bulbs remain without removal until the tops have died down the second year.

HINTS ON THE CULTURE OF THE DAHLIA.

To make these plants flower somewhat earlier in the season, plunge the roots early in February in a slight heat, amongst either old tan, saw-dust, or rotten leaves.

When the shoots are four inches long, separate and pot the roots, cut off all except two shoots to each, and make them into cuttings, and plant these singly in 60-sized pots.

Grafting is commonly performed by fixing a shoot in a piece of the root. Cut a slit two inches long in the tuber, half way through with a sharp knife; and having made the cutting wedge shaped, fit it in, and tie it round with matting; then pot it in a 60-sized pot.

Seeds should be sown in February in pots filled with light rich soil. After they are up, and in rough leaf, transplant them, place in a warm situation where they can have plenty of air. When they are sufficiently large, and the frosts of spring are over, plant them out in the situations where they are to flower.

Taking up the Roots.—When the flowers fade lay a little old tan, saw-dust, or rotten leaves round the roots to prevent them being injured by sudden frost; and after the stems are quite dead, take up the roots in a fine day, and having dried them, lay them on dry shelves where they will be free from frost till the season of planting.

Insects injurious to Dahlias.—The earwig, often greatly damages the flowers, (see page 192) as do also slugs and snails, (see page 194) and the roots are sometimes sadly perforated by the wireworm, (see page 191.)

INSECTS INFESTING THE RANUNCULUS.

Although snails and slugs, in wet seasons, sometimes damage these plants by devouring their tops and flowers, yet they suffer more at their roots by the attacks of the wireworm; for particulars of which see page 191.

HINTS ON THE CULTURE OF THE RANUNCULUS.

Flowering Bed.—In September dig out the soil one foot deep, lay at the bottom of this six inches of rotten cow-dung, and fill up to six inches above the level of the ground with good strong maiden loam, mixed with one-fourth rotten cow-dung.

Plant the broad-leaved varieties in November, and the narrow-leaved ones in February, always selecting the middle sized roots, as they flower better. Rake the bed smooth, fix the roots on the top, with the crowns upwards, in rows, six inches apart, and four inches from root to root, and cover them two inches deep with fine light soil.

Press the soil about each root on a fine day, when the leaves appear above ground.

Water in dry weather, until they are in full bloom, after which desist from doing so.

Shade from violent sunshine particularly when the flowers are coming to perfection.

Take up the roots as soon as the leaves are withered, spread them out in a dry place for awhile, and afterwards put them in paper bags until the season for planting.

HINTS ON THE CULTURE OF THE ANEMONE.

Prepare the flowering bed, plant in February, and treat precisely after the same manner as recommended for Ranunculusès.

Seeds.—Gather the seeds from the finest kinds, and sow on a finely raked bed immediately after being gathered; mix a little dry sand amongst the seed, to prevent the wind blowing it away.

HINTS ON THE CULTURE OF THE HYACINTH.

Prepare the flowering bed just as for tulips, but mix with the tulip compost about one-sixth of fine sand.

Plant early in November, select middle sized conical bulbs, rake the bed smooth, spread over it a thin layer of fine dry soil, mark out the rows across eight inches apart, plant the bulbs the same distance in the rows, place a small portion of sand around each bulb, and cover the whole with about two inches of good soil.

Shelter the bed with hoops and mats in case of frost, or too much wet.

When the leaves wither and the bulbs are ripe take them up, dry them in the sun, separate the offsets and put them in paper bags until the season for planting.

HINTS ON THE CULTURE OF ANNUALS.

All annuals which furnish our borders during the Summer and Autumn, are raised every year from Seeds. Some are sown at once in the borders; these are called "*Hardy Annuals*;" others answer better if sown on a slight hotbed, and afterwards transplanted into the situations they are to occupy for flowering; these are called "*Half-hardy Annuals.*"

HardyAnnuals.—In the beginning of March sow as follows;—loosen the soil in the borders, and make it fine; make a circular shallow drill with the hand, about six inches in diameter, scatter the seeds thinly in the drill, and cover lightly. If a flower pot be inverted over each patch, until the plants are up, it will be of advantage. When the plants have formed their rough leaves thin them out, to give room to grow; and if it be desirable to have a successional supply of flowers until late in the year, it is only nesary to sow again in April or May, andagain in June.

Half-hardy Annuals.—Early in March make a hotbed two or three feet thick, set on a common frame, and after a few days, when the dung has properly sunk, level it, and lay on about four

inches thickness of soil, composed of equal parts of leaf mould, and light sandy loam, make the surface level, and with the finger draw some shallow drills, about three inches apart, sow the seeds thinly, and cover lightly. If a frame is inconvenient, they will do in pots, or even on a warm border out of doors. When the plants have formed their rough leaves, they will be better for being transplanted on another hotbed, expose them to the air by degrees, and when the spring frosts are quite over, remove them with balls to the situations they are to occupy in the flower borders.

HINTS ON THE CULTURE OF HARDY AND HALF-HARDY BIENNIALS.

Biennials are such plants as naturally die the second year after sowing; their existence, however, may be prolonged something beyond this if the flowering buds are nipped off as they appear; they succeed in any light rich soil, and may be sown as follows:—Plants which flower early and ripen their seed in August, should be sown immediately after being gathered; but those not ripening their seed until September or October, should be sown the following Spring. Sow in shallow drills, on a warm border, and cover lightly; when two or three inches high transplant them into other beds, and when sufficiently large remove them with balls to where they are to flower.

HINTS ON THE CULTURE OF HARDY PERENNIALS.

Perennials are either bulbous or herbaceous, both of which lose their foliage wholly, or in part, every year after they have done flowering.

Bulbous Perennials.—Bulbs enjoy a soil somewhat light, and a little rich; never plant very deep; and encourage the growth of the leaves as much as possible. With the exception of Tulips, Ranunculuses, and some other Florist's flowers, it is best

never to take and dry the bulbs, but when it is necessary to separate the offsets, do this always during the season of their torpidity, and replant them again immediately. Any kinds of delicate growth, shelter with an inverted flower pot during the season of torpidity, or heavy rains might destroy them.

Herbaceous Perennials.—The general remarks made under the heads "Stove and Greenhouse Perennials," pages 22 and 114, are also applicable to these, if we except temperature and potting.

SHRUBBERY.

The culture of Hardy Shrubs is generally easy, merely requiring to be planted in a proper soil, suitable situations, and removed at the right season.

Transplanting.—To transplant shrubs or trees without injuring their roots, is difficult in proportion to the age of the plant and the extent of the roots.

By cutting the tap roots of trees their trunks grow shorter, their heads more spreading, and they arrive sooner at perfection with less solidity of wood.

Deciduous Trees.—No deciduous shrub, or tree, should be removed except during the season of hybernation; that is, when the wood is ripe, and the leaves have begun to fall.

Evergreen Shrubs or Trees, if taken up carefully, may be planted with success at all seasons, but if the situation be dry and the soil light and sandy, they will, (with the exception of Hollies,) do best if planted in November and December; but if the soil be low and retentive of moisture, they will thrive best when planted in May. Always take up with balls, and if the weather be dry and sunny, give a supply of water, and should the following season be hot, mulching each with a little half rotten dung would be a great advantage.

Short Selection of Ornamental, Deciduous, and Evergreen Shrubs and Trees:—

Æsculus pavia,	Amelanchier florida,
..... carnea,	..... sanguinea,

Benthamia fragifera,
Berberis dulcis,
Calycanthus floridus,
..... oblongifolia,
Catalpa syringifolia,
Chimonanthus fragrans,
Chionanthus virginica,
Cistus ladaniferus,
Capparis spinosa,
Clianthus puniceus,
Cotoneaster microphylla,
..... frigida,
Colutea Pocockii,
Cratægus oxyacantha punicea,
..... superba,
Cytisus purpureus,
..... nigricans,
Deutzia scabra,
Edwardsia grandiflora,
Garrya elliptica,
Helianthemum formosum,
Hibiscus syriacus,
Illicium floridanum,
Laurus Benzoin,
Mahonia fascicularis,
..... aquifolia,
Malachodendron ovata,
Magnolia,—any of the species,
Philadelphus grandiflorus,
Pyrus spectabile,
..... coronaria,
Ribes sanguinea,
..... aurea,
..... fragrans,
..... speciosa,
Spiræa Bella,
..... grandiflora,
..... trilobata.

It must be understood that the above selection are not intended to supersede the old evergreen and deciduous shrubs and trees, as the Common and Portugal Laurels, Lilacs, Syringas, &c. &c., but only, in connection with these, to add to the splendour of the Shrubbery during the flowering season.

GRASS LAWN.

The lawn is either in its formation covered at once with sods of grass called Scrolling, or sown with seeds: the former is the best, as it forms at once a perfect plot. If, however, it be inconvenient to obtain scrolls, the latter must be resorted to.

In performing the latter, nothing more is required but to level the ground, and sow such kinds of grass as are naturally of slender growth, and retain a close green verdure throughout the year.

In dry situations sow Sheep's Fescue-grass, (Festuca ovina), and Clover, (Trifolium minus).

In good loamy soils, or where there is more moisture, sow equal parts of creeping Fescue-grass, (Festuca rubra), and Sheep's Fescue-grass and Clover.

The proportions are, two quarts of Grass to one pint of Clover to every hundred square yards of ground.

After sowing, rake the seeds in, and roll the ground with a metal roller. The best season for sowing is in August, but if that is inconvenient, it answers well in Spring.

ON GRAVEL WALKS.

Regulate both the breadth and number of walks by the quantity of ground allotted for the garden.

Narrow walks in a large garden, and broad walks when the portion of ground is very limited, are always unsightly, because out of proportion.

Never make unnatural turnings in walks, for the mere sake of having them serpentine; all contortions are unseemly, inasmuch as it is never evident to a person why he should pass on a circuitous rout to an object he observes immediately before him.

In making a serpentine walk, let every turn be rendered as easy and natural as possible, and either plant a shrub, or make a small clump of flowers wherever the walk takes another direction; these obstacles obstruct the view of the observer, and show a reason for every turn the walk is made to take.

After having staked out a walk, dig away the soil from it sufficiently deep to admit of a good layer of broken stones, or brick rubbish for drainage: also, if the ground be not naturally dry, make good drains beneath this rubbish. Having laid the bottoming, cover it with a thin coat of inferior gravel, and finish it off with about eight or nine inches thickness of the best gravel, rake it level, and pass over it a light metal roller.

AMERICAN GARDEN.

By the American garden is meant the situation in which North

American *Bog* plants, such as Rhododendrons, Kalmias, Azaleas, Ledums, &c. are grown.

These plants thrive best when planted in a somewhat shaded situation, where they will not become too dry. The common species of Rhododendron, however, will grow almost any where, provided the soil be not too strong.

Heath-mould, or a mixture of heath-mould, light loam, and sand, is the most proper soil.

The species proper for the American garden may be readily known by referring to any nurseryman's printed catalogue.

INSECTS COMMON IN THE AMERICAN GARDEN.

The first of these we may describe is a beautiful little moth, called the—

ANARTA MYRTILLI.

Beautiful Underwing Moth.—*Plate* 13, *Fig.* 6.

Order, *Lepidoptera Nocturna.* Division, *Noctuidæ.*

Synonyms.—Phalæna Erica.—Noctua Myrtilli.—Small Yellow Underwing Moth.

This pretty creature measures across the wings about three quarters of an inch, sometimes a little more. *First pair* purple-red, with three wavy whitish streaks, a pale border, and three central patches, the middle one being largest and pure white, the other two tinged with pale purple. *Second pair* orange, with a broad black border.

Caterpillar yellow-green, with yellow stripes dividing each segment, and stripes of black passing across. As this moth does no injury, any means for its destruction are unnecessary.

THE BROWN WEEVILS.—*Plate* 9, *Figs.* 1 & 2.

Both these Weevils, in their larvæ and perfect state, are very destructive to American plants; in the larvæ state they feed on the small rootlets, and in their perfect form they attack the young shoots, and soon greatly disfigure the plants. No successful means have yet

been discovered to eradicate them, except that of taking away the soil in which they abound, and supplying its place with a new compost.

ROCKERY.

By Alpine or Rock plants, as generally understood by Gardeners, are not meant those only which naturally grow in Alpine situations, but *all* such as by their minuteness or difficulty of cultivation render it unsafe to plant them amongst others of a more robust growth in a common Flower Garden.

Make the rockery always in a situation where the plants can enjoy a free circulation of air, as from the natural delicacy of many species a confined or shaded place might be injurious.

In planting always pay attention to the several peculiarities of the plants, because some require partial shelter from the sun, and others full exposure to it; and be careful that all be planted in soils suited to their natures; dung is seldom needful to any.

GEOMETRICAL FLOWER GARDEN.

By Geometrical Flower Gardens are meant those in which the flower beds are, in regular or geometrical figures, intersected with many narrow walks, and bordered usually with box.

In Villa and Cottage residences, where the ground is very limited, this kind of garden may be made close to the dwelling-house with very good effect, but where the grounds are extensive and the mansion large, a grass lawn ought to occupy the immediate vicinity of the house, and the flower garden should be at a short distance from it.

No Flower Garden of this description ought to be large, for a large surface intersected with small walks, and covered with plants, the tallest of which scarcely exceeds two or three feet, wears too naked and bare an appearance; and to prevent this, if shrubs be planted and much grass be laid, it approximates too nearly to the Shrubbery Garden, and the general design of it is lost.

MIXED FLOWER GARDEN.

This is the most common kind of flower garden, and the design is to select such kinds of shrubs and border flowers as will present a succes- onal variety of flowers every month in the year, and the greater the variety, and more perfect the mixture, the better the effect.

BOTANICAL FLOWER GARDEN.

In this kind of garden the flowering plants are arranged according to some Botanical system; that of Linnæus was formerly most adopted; but since the Jussieuan has become better understood, most persons have followed it; because the plants being brought together by their natural affinities to each other, present to the observer a more pleasing harmony than any purely artificial system possibly could.

CHANGEABLE FLOWER GARDEN.

By the Changeable Flower Garden is meant a common geometric one, in which the plants, after flowering, are supplied by others from pots, so as to keep up a constant succession of flowers through the greater part of the year.

For instance :—Supposing a number of beds in the garden be planted as follows :—No. 1, with Crocuses—2, Hyacinths—3, Tulips—4, Violets or Hearts-ease—5, Narcissus—6, Ranunculuses—7, Double Anemones—8, Ten-week Stocks, sown in the Autumn—all which beds might be bordered with Snowdrops. All these would flower in spring or early in summer. They might then be succeeded as follows, for general summer and autumn flowering:—Choice Dahlias,—Calceolarias,—Pelargoniums,—Salvia fulgens,—Salvia patens,—Verbena Melindres,—Verbena teucrioides,—Verbena Tweediana,—Ten-week Stocks, sown in spring,—Lobelia erinus,—Heliotropium Peruvianum,—Lobelia fulgens, and splendens, and numerous choice annuals.

For this kind of garden, it is always necessary to keep a good supply of plants in pots, sheltered either in a greenhouse or frame through the winter, and hardened by degrees, until the time appointed for turning them into the beds.

PLANTING BOX EDGINGS.

Always select mild dry weather for planting *box*. After having dug the ground level, tread it, stretch the line, and with a spade cut an even edge six inches deep. Against the side of this trench plant the box, not too thick; place the soil about its roots first with the hand, and lastly with the spade; trample it down carefully, and cover the soil with gravel.

ARBORETUM.

The Arboretum is that part of a pleasure ground planted with a collection of hardy shrubs and trees, arranged in systematic order. The best arrangement is that of Jussieu, usually called the "NATURAL SYSTEM."

RUSTIC ORNAMENTS.

These are of several kinds, as Seats, Arbours, Moss-houses, Temples, &c. &c.

SEATS are sometimes placed under artificial arbours, sometimes under the natural shade of trees, and at other times exposed on the open walks, or lawn.

It must not be forgotten, that any seat placed in the vicinity of a large mansion, must, in some degree, correspond with the character of the building.

ARBOURS are either, *natural*, as the shade occasioned by the weeping ash, willow, &c. &c.; *partly natural*, as where any

trees by their disposition are suitable for the formation of an arbour, and by means of training the branches, placing trellace, or causing creepers to ascend, they are converted into a pleasant retreat; or, *entirely artificial.* Of this last kind there are several as the moss-house, temple, covered seat, &c.

The Moss-house is merely a rustic arbour, built with wooden walls, covered with numerous irregular branches, formed in close, uneven trellace work, and well clothed inside with moss. The roof may either be thatched with straw, or wild heath (Calluna vulgaris), to suit the taste of the proprietor. The pillars may be formed by tying three or more stems of young trees together, then covering them with small irregular branches, and, lastly, filling the interstices with moss. Over these pillars climbing plants may be trained.

The Rustic Temple is similar in structure to the last, may be made of any form, and as lofty as convenient; instead however of clothing the inside with moss, hazel rods, or any other straight branches are nailed close together in short lengths, and of whatever form may please the fancy.

Covered Seats are generally formed after the manner of the rustic temple, usually thatched, and the whole covered with creeping plants.

Rustic Vases may be made of tubs or boxes, with ropes nailed around them in any form that may please; the tubs are supported by legs, made of rough pieces of the stems of trees. When the whole is painted, the inside filled with soil, and abundance of low growing plants hanging their drooping flowers over the sides, a beautiful effect is produced. Mr. Clowes, of Old Broughton Hall, Manchester, is the first we observed use this kind of ornament, and when we called upon him four years ago, he was kind enough to furnish us with several designs.

ARCHITECTURAL ORNAMENTS,

Such as Vases, Temples, Pedestals, &c. &c. may be placed with a good effect in suitable situations, but they should always be made to correspond with the general character of the mansion.

GROTTO.

A grotto is generally a cave, with windows to admit light, or a rough building, bearing from its situation some correspondence to a cave. Upon the inside walls of this building, spar and minerals are so disposed as to give, by means of light and shade, a glittering and fine effect to an observer. As a general guide to the formation of this kind of structure, look into the internal caverns where spar and minerals are naturally obtained.

Fasten the spar and minerals in the side walls with a mortar made of quick lime, sifted fine, and milk; mix little of it at a time, because it soon sets, and is incapable of being worked.

A grotto should never be placed in highly cultivated grounds; when introduced into pleasure grounds, select as sequestered and romantic a situation as possible.

SHELL HOUSE.

The shell-house being a purely artificial building, may be introduced into highly cultivated situations; the structure itself should be made neat, and of any form to suit the proprietor, and the shells may be fastened to the walls by the same kind of mortar as that recommended for grottos.

FOUNTAINS.

Every fountain requires a reservoir to supply it with water, and in the same proportion as the reservoir is made on higher ground than the fountain to be supplied, allowing for friction and other circumstances, will the water of the fountain be projected.

The pipe which conveys the water from the reservoir should be made either of lead or iron, and must be four times wider in the bore than the jet required; that is, if the conducting pipe be two inches in the bore, the jet of the fountain will be half an inch.

The ajectage, or small projecting pipe, may be made of any design to suit the proprietor; and the main conducting pipe may be made to pass through any figure suited to the situation.

INSECTS INFESTING AND DESTROYING DRIED SPECIMENS OF PLANTS.

TINEA TAPETZELLA.

Black and White Clothes-Moth.

Order, *Lepidoptera Nocturna.* Division, *Tineidæ.*

Synonym.—Black-cloaked Woollen Moth.

This beautiful little moth is very destructive to herbariums, and Museums of Natural History. The wings measure, when expanded, nearly three quarters of an inch. The head is white. *First pair* of wings black and white; *second pair* yellowish brown. Caterpillar white, with a brownish head.

TINEA DESTRUCTOR.

The Destroying Clothes Moth.

Order, *Lepidoptera Nocturna.* Division, *Tineidæ.*

This is another very destructive little creature to all specimens of Natural History. The caterpillar is the same colour as that of the *T. tapetzella.* This moth is about the size of the last. The *first pair* of wings are pale yellowish brown; *second pair* paler. Both this and the last appear to have three or more broods in the year, and will intrude into drawers, glass-cases, or any other place where specimens of Natural History are kept. Camphor appears to be a preventative, but its fumes will not destroy the caterpillars if they have already commenced their depredations.

HINTS ON FORMING AN HERBARIUM.

1. Paper for drying.—The most suitable paper for drying specimens of plants is that of a soft texture, capable of absorbing

a considerable degree of moisture; of this kind is the red or white blotting paper.

2. Press.—A simple press may be made of two boards, one to place below and another above the specimens whilst drying, and pressed together by placing a weight on the upper board. For most purposes two bags filled with dry sand, one placed below and the other above the specimens answer well, and the whole placed either on a warm flue, or in an oven not too hot.

3. Gathering Specimens.—Select them when in full flower, as perfect in all the parts as possible.

4. Always choose a perfectly dry day for gathering specimens, for if any moisture be upon them, they either become discoloured during the process of drying, or perish altogether by mouldiness.

5. Fixing for Drying.—Place the specimens on the paper in as natural a position as possible, laying as many on each sheet as you conveniently can.

6. After having filled one sheet of paper place over the specimens another, fill this, and continue to pile them up until all are fixed, then place them in the press.

7. Pressing.—During the process of pressing it is necessary to examine and remove any paper that has become too wet.

8. Ericas and other plants liable to lose their leaves by drying should be dipped in scalding water, and then dried betwixt sheets of blotting paper.

9. Succulents may be placed between sheets of paper, and dried with a hot iron.

10. Fixing Specimens when dry.—Place them in books made of strong cartridge paper, and write the names and other particulars under each specimen.

CALENDARIAL INDEX.

WORK TO BE DONE IN JANUARY.

Auriculas, top-dress at the end of the month, and keep the soil somewhat dry, page 188.

Camellias placed in heat, will shortly flower, page 7.

Calceolarias should be re-potted at the end, page 149.

Dahlia seeds should be sown at the end, page 201.

Greenhouse plants, treat as on page 105.

Grass Lawns may be made in fine weather, page 206.

Gravel Walks, form as on page 207.

Hyacinths. For their treatment at this time, see page 203.

Lilacs, place the Persian kinds in heat to bring them into flower, page 98.

Mignonette sown in pots at the end, and placed on a slight hot-bed will flower in May, page 197.

Polyanthuses require top-dressing at the end, page 187.

Pinks and Carnations, take into the stove for forcing, as explained on page 98.

Plant deciduous Trees, as explained page 205.

Pruning hardy trees and shrubs may now be done, if the weather be not very severe.

Protect all plants from the effects of cutting winds.

Roses placed in the forcing-house in the beginning, will flower in the beginning of April; if placed in heat at the end will flower in the middle of April, pages 100, 176.

Ranunculuses planted in the beginning, and sheltered with a frame of glass, will flower in the beginning of April, page 202.

Temperature. The proper heat for the Stove this month is 50 degrees by night, and 60 degrees by day; and for the Greenhouse, 40 degrees by day, and night.

Ten-week Stocks sown in pots at the end, and placed on a slight hotbed, will flower about the end of May.

Average quantity of Sunshine, 10 hours morning, 14 hours evening, generally with frost, snow, and dashing rains.

WORK TO BE DONE IN FEBRUARY.

Annuals, Tender, sow in pots, and plunge in a hotbed, about the middle or from that to the end, see page 89.

Annuals, Half-hardy, sow under hand-glasses, or in a frame, on a slight hotbed, at the end of the month, page 203.

Annuals, Hardy. In warm situations, if the weather be open and the soil light and dry, sow about the end, page 203.

Auriculas and *Polyanthuses,* top-dress early in the month, if not done in January, page 187.

Biennial Flower Seeds, sow as directed for Half-hardy Annuals, page 204.

Box-edgings, continue to plant whenever the weather is fine, page 211.

Camellias, graft, inarch, and strike from cuttings, page 5.

Carnations and *Pinks,* transplant with good balls to the situations where they are to flower, any time after the middle, page 194.

Dahlia Seeds, sow in pots, as tender Annuals, about the beginning, and place old roots into a little heat to start them, page 201.

Digging borders, about the end proceed as rapidly as possible.

Greenhouse plants should now be watered, as recommended page 102.

Hyacinths, protect choice ones from severe frosts and excessive wet, page 203.

Herbaceous plants of hardy species, separate and plant any time this month, pages 22, 114, 205.

Lawns, continue to lay in open weather, page 206.

Nelumbiums re-pot, page 85.

Nymphæas, of tender kinds should now be started growing, page 85.

Perennials, sow at the end, after the manner of half-hardy Annuals, page 203.

Prune shrubs, roses, deciduous trees, &c. any time when the weather is not severe.

Roses, in pots placed in the forcing-house in the beginning, will flower in the middle of April, pages 100 and 176.

Ranunculuses plant in beds at the end, page 202.

Tulips, protect from excessive wet, page 200.

Tube-roses pot in 24 sized pots, page 138.

Walks, make as explained page 207.

Temperature of the *Stove,* 55 degrees by day, and 50 by night, *Greenhouse* 40 degrees by day, and night, pages 51, 105.

Average quantity of Sunshine, 28 hours morning; 44 hours evening; generally with a deal of wet, and short but severe frosts.

WORK TO BE DONE IN MARCH.

Anemones and *Ranunculuses,* if not previously planted, do it early in the month, page 202.

Auriculas and *Polyanthuses* will now begin to show flower, page 187.

Alpines, and similar delicate plants, should now be re-potted in small pots, page 209.

Annuals, Tender, sown last month, will require pricking out, page 89.

Annuals, Half-hardy, will also require pricking out on a slight hotbed, page 203.

Annuals, Hardy, from the middle to the end, all the kinds may be sown in any situation, page 203.

Biennials and *Perennials* may be generally sown towards the end, pages 22, 114, 204.

Carnations and *Pinks* place in their flowering situations as early in the month as possible, if not done before, page 194.

Camellias should now be shaded from the mid-day sun, page 7.

Digging the Borders may be continued through this month.

Dahlia Roots plunge in old tan, in any situation where they will get plenty of heat and light to start them into growth, page 201.

Forcing Flowers. Take in for the final flowering early in the month, page 100.

Grass Lawns and *Walks* should now be dressed, rolled, and otherwise prepared for the spring.

Greenhouse Plants of many kinds should now be propagated, page 107.

Hyacinths. As the flower stems advance support them with neat sticks, and shelter from frost, rains, and winds, page 203.

Herbaceous Plants, if not planted last month, get them separated, and planted as early as convenient, page 204.

Mignonette sown in pots at the end of January, or beginning of February, should be thinned, page 197.

Nelumbium Seeds sow early in the month, page 85.

Orchidaceous Plants require attention, p. 90.

Palms for their treatment now, see page 66.

Plant Shrubs and *Trees.* Select dripping weather, and get all deciduous kinds in as early as possible, page 205.

Stove Plants now require attention, page 46.

Tigridia pavonia. Plant the bulbs in the beds appointed for them any time after the middle, page 141.

Viola tricolor plant in beds when it is intended to flower.

Temperature for the *Stove,* 65 degrees by day, and 55 by night. *Greenhouse,* 45 by day, and 35 by night, pages 46 and 102.

Average quantity of Sunshine, 50 hours morning, 60 hours evening, generally with cutting east or north winds.

WORK TO DE DONE IN APRIL.

Auriculas. When the flower buds have advanced sufficiently thin them out, page 187.

Anomatheca cruenta, about the middle, plant on a warm border in the open air, page 141.

Banksias any time this month may be potted. Take particular notice of the directions, page 138.

Bouvardia triphylla re-pot any time after the middle of the month, page 111.

Box Edgings may now be generally cut, as the severity of the frosts may be considered for the most part past. Also planting new edgings may still be performed, page 211.

Camellias now out of flower should be re-potted, and placed in a little heat, page 6.

Calceolarias. Sow seeds of all kinds, plant cuttings, re-pot herbaceous kinds, and harden those intended for the open borders, previously to their being turned out, page 149.

Chrysanthemums may now be struck from cuttings, or their roots divided, page 146.

Dahlias, plant in the borders not earlier than the end, page 201.

Erica cuttings may be put in this month, page 150.

Evergreen Shrubs can be planted with perfect safety any time this month, on wet heavy soils, page 205.

Lobelia fulgens, &c. separate and plant in pots in situations where they are to flower.

Oxalis crenata should be planted early in this month in warm situations, and sheltered from the effects of frosts.

Orange Trees, graft any time before the middle, page 131.

Proteaceous plants, sow seeds of, page 139.

Rose trees may now be budded, page 175.

Tube roses, plant in 24-sized pots, page 138.

Violets. This is the best month for transplanting.

Temperature for the *Stove,* 80 degrees by day, and 60 degrees by night; *Greenhouse* 60 degrees by day, and 50 by night, pages 46, 102.

Average quantity of Sunshine, 50 hours morning, 78 hours evening, generally with warm and sudden showers, and often cold east winds.

WORK TO BE DONE IN MAY.

Azaleas, of tender kinds, should be potted as they go out of flower, and plant cuttings as soon as the young wood is ready, page 125.

Auriculas in pots out of flower should be potted, page 187.

China roses may now be propagated by cuttings, page 175.

Calceolarias, turn out into the open borders as soon as the frosts are over, page 149.

Cyclamen persicum now out of flower entirely suspend watering, page 135.

Cactus, of various species, now introduced into a brisk heat will show plenty of blossom buds, page 81.

Carnations. This is a proper time for sowing the seeds of both Carnations and Pinks, page 194.

Epacris, and other plants of similar habits, may now be propagated by cuttings, page 132.

Hollyhocks may be parted at the roots any time in the beginning of the month.

Orange trees should be grafted early in this month, page 129.

Proteas, and other plants of similar habits, may now be propagated, page 138.

Pelargoniums should now be propagated by cuttings, when they can be obtained without injuring their flowering, page 147.

Passifloras, of most kinds, now strike very freely, page 75.

Roses, prune for late flowering, insects too begin greatly to infest them this month, page 175.

Rockets may now be increased.

Verbena Melindres, Tweediana, &c. should now be propagated extensively by the young shoots planted in pots of light soil, and plunged in a little heat, page 136.

Violets continue to collect, and plant runners.

Wallflowers, now is the time to plant cuttings, either under a hand-glass or close beneath an eastern or western wall.

Temperature for the *Stove,* 85 degrees by day, 65 degrees by night; *Greenhouse* 65 degrees by day, 55 degrees by night, pages 46, 102.

Average quantity of Sunshine, 102 hours morning, 90 hours evening, generally attended with vigorous growth, assisted by warm days and occasional showers of rain; the nights, however, are often cold from the prevalence of easterly winds, until after the 20th.

WORK TO BE DONE IN JUNE.

Auriculas and *Polyanthuses,* now out of flower, should be repotted; page 187.

Azaleas of tender kinds, may all now be potted, if the flowers have fallen. Shortly after they are potted, place them out of doors, page 125.

Annuals, half hardy, plant out in the situations where they are to flower, page 203.

Annuals, hardy, now sown will flower in September, page 203.

Banksias, and other Protaceous plants, may now be placed out of doors, but it is most advisable not to do so if convenient, page 139.

Biennials transplant in the borders, page 204.

Camellias having formed their flower buds, gradually expose, preparatory to their removal out of doors, page 7.

Chrysanthemums propagate by layers, page 146.

Carnations in pots, top-dress early in the month, page 194.

Calceolarias propagate generally by cuttings, page 149.

Dahlias, plant in the open borders, page 201.

Ericas, continue to put in cuttings, page 150.

Epacris Tribe, now place out of doors, page 132.

Greenhouse Plants may now be turned out of doors, page 104.

Hollies. This is the best time in the year for removing them. Select dripping weather, and water freely.

Hyacinths, the tops being now dead, take up, page 203.

Pelargoniums, continue to put in cuttings, page 147.

Pinks may be increased by pipings any time after the middle.

Primula sinensis, this is the best time to sow the seeds, page 137.

Rose Trees bud towards the end, page 175.

Rockets, divide the roots for propagation.

Succulents may be placed out of doors about the middle, page 81.

Stove Plants, for the treatment now, see page 47.

Temperature for the *Stove,* 85 degrees by day, 65 degrees by night; *Greenhouse,* 65 degrees by day, 55 degrees by night.

Average quantity of Sunshine, 130 hours morning, 90 hours evening; generally settled warm weather, perhaps the most pleasant month in the year, pages 46 and 102.

WORK TO BE DONE IN JULY.

Auricula and *Polyanthus* seeds should be sown as soon as ripe, page 187.

Azaleas, of tender kinds, propagate by cuttings of the young wood, page 125.

Banksias, and other proteaceous plants, may now be increased by cuttings, page 138.

Cactuses, turn out of doors early in the month, page 81.

Calceolarias, about the end cut down the flowering stems, and top-dress, to induce them to flower in Autumn, page 149.

Carnations, commence layering, page 194.

Camellias, place in a shady situation out of doors, page 7.

Epacris, and plants of similar habits, turn out of doors early in the month, page 132.

Hearts-ease, sow the seeds as soon as ripe.

Mule Pinks. This is the season for putting in the cuttings.

Orange and Lemon Stocks may be budded at the end of the month, if the bark will rise, page 129.

Pinks, commence putting in pipings, page 194.

Rose Acacias and Roses may be made to flower very late in the Autumn, if the flowering shoots be now cut back, page 175.

Ranunculuses, the tops being dead, should now be taken carefully up, page 202.

Violets may now be planted out in abundance.

Temperature of the *Stove,* 85 degrees by day, 65 degrees by night, *Greenhouse,* 65 degrees by day, 55 degrees by night.

Average quantity of Sunshine, 85 hours morning, 95 hours evening. Warm weather, usually attended after the middle of the month with many showers of rain.

WORK TO BE DONE IN AUGUST.

Biennials. This month many of the Biennials ripen their seeds, which should be sown immediately, page 204.

Camellias, if wanted to flower before Christmas, should be brought into the greenhouse about the middle of the month, page 7.

Calceolarias, early in the month cut down, and top-dress, and they will flower throughout the autumn, page 149.

Cinnamon cuttings of different kinds strike freely if put in this month, page 15.

Carnations. This is the chief month for layering, page 194.

Chrysanthemums should be potted in flowering pots early in the month, and watered with manure water, page 146.

Hearts-ease seeds may be sown as soon as ripe.

Ipomopsis, Schizanthus retusus, and some other species of Biennials. This is the best time to sow the seeds, page 136.

Mignonette and *Ten Week Stocks* for flowering very early in Spring, should be sown in the second week, page 197.

Orange and Lemon Stocks should be budded as early as possible, page 129.

Pinks propagate abundantly by pipings, page 194.

Pomegranates increase freely by ripened cuttings any time this month, see Punica, page 108.

Rose Trees continue to bud early in the month, page 175.

Rockets propagate by cuttings towards the end.

Tigridia pavonia. Take up the roots as soon as the tops are sufficiently dead down, page 141.

Verbenas, of most kinds, now propagate freely, and abundance should be put in for planting out in the borders next Spring, page 136.

Temperature of the *Stove,* 85 degrees by day, 70 degrees by night; *Greenhouse,* 70 degrees by day, and 60 by night.

Average Quantity of Sunshine, 75 hours morning, 90 hours evening; weather warm, often very sultry.

WORK TO BE DONE IN SEPTEMBER.

Camellias, take in another supply for flowering early, to succeed those taken in last month, page 7.

Calceolarias, cut down early in August, will come into flower

about the middle, place them in an airy part of the greenhouse, page 149.

Chrysanthemums in pots, water regularly with manure water, page 146.

Greenhouse Plants, of most kinds, are better taken into the house about the end, page 105.

Cactuses, of all kinds, should now be housed, page 81.

Cyclamen persicum turn out into a warm border in the first week, page 135.

China Roses propagate now for planting out next Spring, page 175.

Gladiolus in pots, should be taken up and replanted in fresh soil about the end, page 141.

Gardenia radicans. Cuttings strike freely if put in towards the middle, page 77.

Hyacinths, plant in beds any time after middle of the month, page 203.

Hearts-ease. Young plants, raised from seed sown last month, should now be pricked out.

Primula sinensis in the last week, should be propagated by cuttings, Page 137.

Petunias, of various kinds, should now be struck for the borders next Spring.

Succulents should now be brought in, page 82.

Thunbergia alata, place upon a warm flue for the Winter, page 78.

Temperature of the *Stove,* 85 degrees by day, 65 degrees by night. *Greenhouse,* 65 degrees by day, 60 by night.

Average quantity of Sunshine, 60 hours morning, 58 hours evening.

WORK TO BE DONE IN OCTOBER.

Auriculas, Polyanthuses, Carnations, &c. should now be placed in a frame for the winter, pages 187, 194.

Bulbous Plants of several kinds should be planted at the end, pages 87, 114, 140.

Camellias remove into the greenhouse, page 7.

Deciduous Trees and *Shrubs* may be removed with safety after the middle, page 205.

Chrysanthemums in pots remove into the greenhouse, and give abundance of air, page 146.

Cyclamen Persicum take up from the borders about the middle, page 135.

Dahlias, take up as soon as the tops are completely dead, page 201.

Forcing. Plants of various kinds will now require potting, for flowering in winter, page 98.

Greenhouse Plants should be watered in the mornings, this month, page 102.

Hyacinths, to succeed the last, should be planted in the end, page 203.

Nelumbiums. When the tops are dead allow the soil to become dry, page 85.

Orchidaceous plants require attention, page 90.

Roses in pots, now brought into the forcing-house, will flower in January, page 175.

Tulips, plant in beds at the end, page 200.

Verbenas, collect all the rooted shoots and pot them for the borders next spring, page 136.

Temperature for the *Stove,* 70 degrees by day, 60 degrees by night; *Greenhouse* 60 degrees by day, 50 degrees by night.

Average quantity of Sunshine, 36 hours morning, 40 hours evening; weather cold towards the end, with white frosts and considerable rains.

WORK TO BE DONE IN NOVEMBER.

Azaleas, of tender kinds, now brought into the forcing-house, will flower in February, page 125.

Camellias, wanted to flower early, introduce into heat, page 7.

Chrysanthemums, in pots, must have abundance of air, or they will flower weakly, page 146.

Forcing. Introduce Rhododendrons &c. into gradual heat, about the end, page 98.

Greenhouse plants now require attention, page 105.

Mignonette and *Ten-week Stocks,* shelter in a frame, page 197.

Oxalis crenata, take up the tubers and preserve them till spring, like potatoes.

Palms, for the treatment now, see page 66.

Priestleya. See well to the genus during the three winter months, page 134.

Roses in pots, now placed in the forcing-house, will flower in February, page 175.

Stove plants require attention, page 51.

Succulents must be kept dry, pages 50, 81.

Tulips plant early in the month, page 200.

Temperature for the *Stove,* 60 degrees by day, 50 degrees by night; *Greenhouse,* 45 degrees by day, 40 degrees by night.

Average quantity of Sunshine, 30 hours in the morning, 28 hours in the evening; weather cloudy, attended with frost and much rain

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WORK TO BE DONE IN DECEMBER.

This chiefly consists of preparing composts, new ground work, forcing flowers of various kinds, protecting plants in the open air that are somewhat tender, preventing the frost from injuring those placed under the glass, digging, and other work of a similar kind, as the weather will allow.

Temperature for the *Stove,* 58 degrees by day, 50 degrees by night; *Greenhouse,* 40 degrees by day, 35 degrees by night.

Average quantity of Sunshine, 25 hours morning, 20 hours evening; with frost, snow, rain, and cold cutting winds.

MIMULUS McLANII.

Mr. McLane's Monkey-Flower.

This very splendid hybrid was raised in 1839 by John McLane, Esq. of Herald's Cross, Dublin, from seeds of Mimulus Harrisonii fertilized, with the pollen of M. cardinalis. It grows from 18 inches to 2 feet high, with the habit of M. cardinalis, is a very profuse flowerer, and without doubt far superior to any kind hitherto in our collections.

Being as hardy as its parents, the treatment it requires is perfectly simple, thriving in any common soil in a moist situation.

The stock was purchased from its originator by Mr. Davis, nurseryman, &c., Ogles Grove, Hillsborough, who is now disposing of plants at the low price of 10s. 6d. each.

It was named in compliment to the gentleman who first raised it.

Mimulus M. Lewisii

INDEX.

GARDEN PESTS.

THE MARGUERITE DAISY-FLY (PHYTOMYZA AFFINIS).

The leaves of various plants belonging to the natural order Compositæ, or Daisy-like plants, particularly those of Marguerite Daisies, Chrysanthemums, and Cinerarias, are often much injured by the grubs of this destructive fly, which burrow into the leaves and feed on their inner substance. When many leaves are attacked in this way the plants are not only rendered unsightly, but suffer in health very considerably by so many of their leaves having been rendered useless. The attacks of these grubs may at once be recognised by portions of the leaves losing their colour and appearing blistered. In the figure the darker parts of the leaves are those which the grubs have not yet reached, and the oval blisters show the positions of the grubs, and the small black dots their droppings. The most certain method of destroying this insect is to go carefully over the plants as soon as it is noticed that they are attacked, and pick off any leaves which are so badly infested as to be rendered useless; these should immediately be burned. In the other leaves the grubs may be killed by pinching them firmly at the place where the

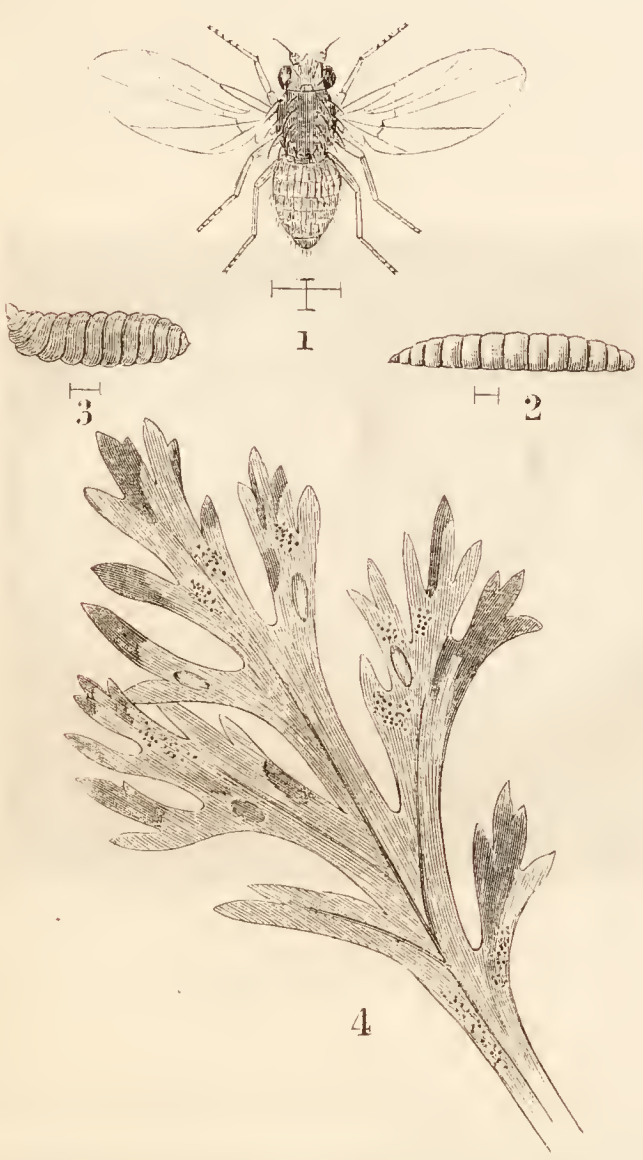

Fig. 1, Marguerite Daisy-fly (Phytomyza affinis); 2, grub of; 3, chrysalis of (all magnified); 4, leaf mined by grub.

grubs are. By placing the plant towards the light so that you can look through the leaves, the position of the grubs will be easily seen. When the grubs are very young their position can only be detected by a small, greenish, transparent spot, about 1-10th inch in diameter, in which is the grub, and running a needle through the leaf at this point would probably kill the grub. When plants, which have been infested, are cut down after flowering, the parts cut off should be burnt, and not thrown on to the rubbish-heap, for if any of the grubs are full grown they will undergo their transformations just as if the plant was still growing. Various washes have been recommended, but it is very questionable if they are of any practical value, for if used of sufficient strength to kill the grubs, through the skin of the leaf, it would probably injure the sound leaves. The fly usually makes its appearance in the spring, and lays its eggs on the undersides of the leaves, probably just under the skin. The grubs attain their full size in the course of a fortnight or three weeks. They then work their heads through the skin of the leaf, and become chrysalides, from which the flies emerge in due course. If the grub did not make provision in this way for the escape of the fly into the open air as soon as it leaves the chrysalis, it would not be able to make its way out of the leaf. There are several broods of this insect during the summer, so that it is very important to kill as many of the grubs of the first brood as possible. The Marguerite Daisy-fly is a small insect about 1-10th inch in length, and measures not quite a ¼ inch across the wings. The general colour of the fly is blackish-brown, but the head between the eyes, which are red, is paler, and so are the edges of each joint of the body—the knees. The head and body are sparingly covered with stiff black hairs. The grubs are of a pale, transparent green colour, and when full grown are about 1-10th inch in length. They have no legs. The chrysalides are about the same length as the grubs, but are somewhat stouter. The joints are very well defined. G. S. S.

OUTDOOR PLANTS.

SOME GOOD CACTUS DAHLIAS.

Few plants have improved so rapidly as the Cactus Dahlia, both in habit, freedom of flowering, and colour. I am not, however, going to predict a time when they will annihilate the large double kinds and the neat Pompones, for each section of the Dahlia family has its admirers. I, like many others, admire all. The Cactus varieties, however, possess a grace and beauty peculiarly their own, and some of the most lovely tints imaginable are to be found amongst the new kinds.

The greatest drawback to them in former years has been their shy blooming nature and the covering of the flowers by the leaves owing to short stalks. Happily, these discrepancies have been greatly remedied. True, a few very choice kinds are still at fault, but this can be overcome by pruning and nipping out some of the buds.

To be entirely successful it is necessary to have good, healthy, sturdy plants about 12 inches high for planting out the first week in June. Plant in rich soil, and water during dry weather. Train up to neat stakes, about three to each plant, tying one good stem to each stake. Thin the laterals and side-shoots well, leaving only here and there one, and when a number of buds form at the end of the shoots select one for each shoot and remove the others. This will cause the flowers to come out from the foliage, when the result will be most gratifying. To stimulate growth, dissolve a little nitrate of soda or sulphate of ammonia in water, and water the plants with this about once a week when they have become well established. Be careful, however, to not use it too strong, or the result will be fatal. Try ½ oz. to a gallon of water to commence with, and do not give water nearer to the stem than 12 inches. Some varieties, however, do not need very vigorous pruning. Those needing well thinning I mark thus—*. The following is a selection: *Lady Penzance, a beautiful yellow, and undoubtedly the finest in the family; whilst for a white, Mrs. A. Peart is unique; it is very free-flowering, has splendidly curled petals, and throws its flowers well up. This much may be said of Gloriosa, that superb scarlet, large, dazzling, and far ahead of all others of this colour. Bertha Mawley is an excellent variety, of a cochineal colour, not so large, but a magnificent flower. For a combination of hues, Countess of Radnor is excelled by none; it is very free, of a good size, but the flower-stalks are short. Matchless is of a rich velvety texture, while for freedom of flowering and throwing its flowers well above the foliage it is everything that can be desired. *Delicata is of an exquisite shade of soft peach, and free. An excellent sort is Kynerith, a rich deep vermilion, and wonderfully free-flowering; it does not hide its flowers, and has the further advantage of never showing green scales at the base of the petals. Mrs. Francis Fell is a new white, and we are told will be a great improvement on Mrs. A. Peart. Should this be correct it must be a splendid addition. The above are all true Cactus kinds. Many of the so-called Cactus, excellent in their way, are decorative varieties, all of which flower freely, and make good border plants.

J. Hesford, *Recreation Ground, Eccles.*

50, 57, 64.—**Bulbs after flowering.**—The plan I have always practised with my pot-bulbs after their flowering has been to cut off the flower-spikes as soon as faded, remove the