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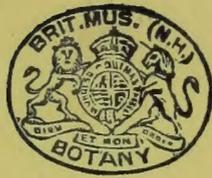
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WINDOW GARDEN.—INTERIOR.

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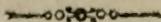
AND

COUNTRY COMPANION.

Illustrated with Coloured Plates and Wood Engravings.

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FLORAL WORLD

GARDEN



COUNTRY COMPANION

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THE FLORAL WORLD

AND

GARDEN GUIDE.

WINDOW GARDENING.

BY JOHN R. MOLLISON.

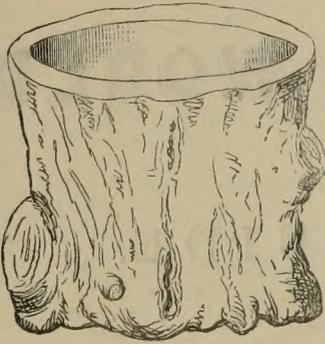


EVERYONE delights in possessing a flower, from the poor in the back lanes of the city, who treasure their one little plant, struggling for existence in the poisoned atmosphere, to the wealthy with their gardens and plant-houses, stocked with all the rarest plants and flowers that money can procure.

The love of flowers arouses within us all the kindest feelings of our nature, humanises the heart, and fills the mind with pleasant ideas and associations. Many a poor man has been saved from alluring temptations that might have been his ruin, by his spare time being taken up with his love for gardening; the cultivation of his garden-plot, and the tending of his flowers, proving far more attractive than the company of idle companions, or the false pleasures of the beer-shop. What a pleasant sight it is to see the cottager thus attending to the beauty and comfort of his home. Truly the love of flowers is one of the best agents of the temperance cause; all friends of the movement should ever make it their endeavour to arouse their hearers to its importance and encourage the establishment of cottagers' flower shows; for the healthy rivalry engendered by them works like a charm for the general benefit of the district in which they are held.

The lover of flowers though he only possesses one single plant, enjoys a real pleasure in the care and attention he bestows upon it—a pleasure which the very poorest may enjoy, even though shut up in the heart of a large city. It is principally for those who live in towns and large cities, who have no convenience for cultivating flowers but their windows, that I write these pages. Therefore I will try to give as clear information on the cultivation of window plants as I can, using the simplest language, so that I may be

understood by all ; and if what I say should enable anyone to grow his or her flowers to greater perfection and in larger variety, and induce those to grow a few flowers who never have done so before, I shall be amply repaid. But most of all would I hope to confer a

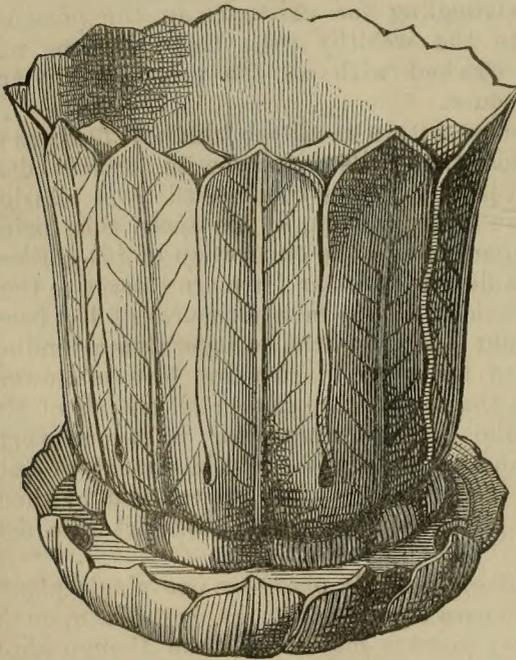


benefit on the invalid whom God in His merciful visitation has deprived of the pleasure of enjoying the possession of a few plants, except in the sick room. To the invalid more than anyone a flower is the messenger of joy, soothing the pain and loneliness of many a weary hour.

There is a great variety of flowers which can be grown to comparative perfection in a window, provided the window has a southern exposure, more or less, so that the plants may enjoy the benefit of the sunshine ; and with the requisite

attention to keep them clean, free from vermin, and properly watered. All this I will try to explain in a simple and practical manner.

What a wonderful hold the floral beauties of nature have on the human heart ! Go where you will in town or country, the love of flowers is displayed on every hand. It holds sway in the city from the button-hole bouquet to the great floral exhibitions ; from the



struggling geranium in the city alley to the gorgeous display in the parks and public gardens. In the country it is a poor cottage that has not its flower-plot or window plant. What a charming sight it is to pass through a country village where the queenly rose, the carnation, the pansy, geranium, fuchsia, and a host of other favourites gladden the eyes with their well-known beauties. The general appearance of the outside of a cottage home may be always taken as pretty sure evidence of the character of its inmates. You can point out at once where the lover of flowers dwells.

Every lover of flowers has of necessity a large heart, capable of love and sympathy for all mankind ; willing always to think the world very beautiful, and God ever bountiful, who gives all men the breath of life, so that they can enjoy the beautiful works of His hand, and

with full hearts to lift their thoughts in thanks and praise for His mercies, even though the troubles of life beset them at every step. I honour and admire the lovers of flowers, and would do all I could to encourage them. Often when I see the cottager spending his evening hour in his little garden, and hear him eagerly tell me the history and peculiarities of this and that favourite, my hand fairly itches to give him the right hand of fellowship, and bid him good-speed in his pleasant occupation. Honour be to those who thus feel the elevating influence of a lovely flower, and I am sure the flowers pay back tenfold interest for the attention bestowed on them by the pleasant feelings, hopes, and aspirations which they arouse within the heart.

Now, my dear readers, I will enter upon the practical details of my subject in earnest, and the first part I have to consider is the suitable kinds of flower-pots, pans, vases, hanging-baskets, etc. The common earthen-



ware flower-pots are sold by the "cast"; the number of pots in a cast varying according to their size the price generally being three shillings per cast. The inside measurement of the rim is always taken. There are 60 two-inch wide pots in a cast, which are called "sixties"; 36 four-inch, 30 five-inch, 18 six-inch, 12 seven-inch, 8 eight-inch, and 6 nine-inch, which is the largest size you will ever require, though they run on to 1 sixteen-inch in the cast, which is the largest size made. Any seedsman or nurseryman will supply you. Earthenware pans of various sizes are also used, and are better than pots for growing annuals, some kinds of low-growing ferns, selaginellas, and for sowing seeds or rooting cuttings in. You should have one or two of them, as they are very useful, and for some purposes you will prefer them to pots. You should also have earthenware flats for standing pots

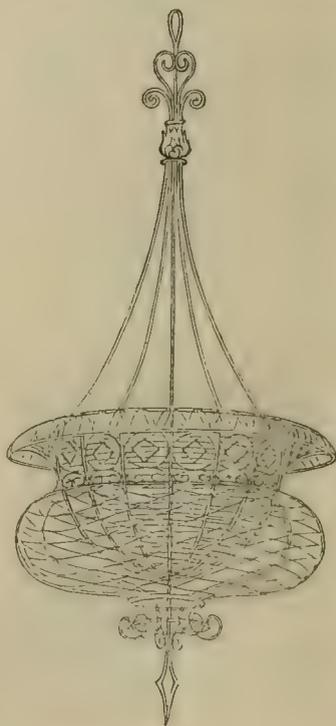
in; they are far neater than plates or saucers, which are often used for the purpose, and are moderate in price.



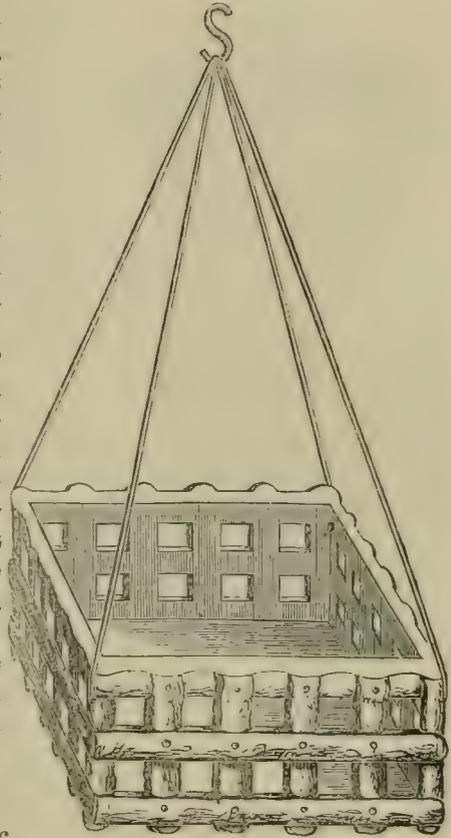
But the flower-pot allows of a wide definition according to circumstances or necessity, for you will sometimes see fair specimen plants growing in an old teapot, jar, jug, or even, as I have seen, in an old tin can. I know an old woman at the present time who has a pretty red China rose flourishing in an old tin can, and a small lemon plant growing in an old Coleman's mustard tin with the bullock's head on it entire. Well done, old lady, you deserve credit. Still regular pots are best, for they have a purpose-like appearance, though, as I have hinted, the want of pots need not deter any one from growing window plants. All makeshifts, however, should have holes punched out in the bottoms for drainage.

It is very interesting to have a wire basket hanging from the centre of the window, with a saxifrage or the Aaron's beard of the cottagers, ivy-leaved geranium, or any other hanging plant grow-

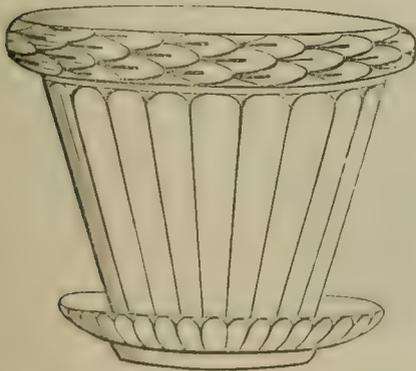
ing over it. A wire basket is easily made, and when tastefully arranged, is a very creditable thing to display; but you can purchase them of various designs and moderately cheap from any seedsman. The one figured here is a very good example of a galvanized-iron wire basket. Galvanized iron wire is the best material for your purpose; but you can also make very pretty ones with hazel boughs, willows, knotty wood, virgin cork, or pine cones, which can be nailed on a wooden frame. When neatly made and varnished, homemade rustic flower-baskets look very pretty. Two or three plies of small wire twined together in the form of a cord, makes a very good suspender for a basket. Three, or at most four, of the twined wires, of sufficient length for the basket to hang down gracefully, joined together in a stout ring, and having small hooks to catch the basket, are quite enough. Earthenware baskets, as represented by the figure on p. 5,



are excellent contrivances ; in them the roots of the plant meet with a more genial material than wood or iron, and have also a neat rustic appearance. But of course your own taste will guide you in the construction or purchase of a hanging basket. An excellent substitute is a little square piece of wood with a hole in each corner, through which strings are drawn, knotted under the holes, and joined above to loop over the nail. This little platform will hold a pot and saucer nicely, and when the plant has grown a little, will be a great ornament to your window. An enamelled tile with a hole drilled in each corner answers the same purpose, and looks neater. This is the cottager's favourite way of suspending a plant in a window, but I dare say you will find wire answer the purpose better than twine.



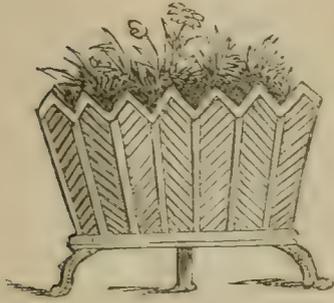
Nothing looks so handsome as a small terra-cotta or Etruscan pot or vase, with a nice plant in it standing in your parlour. Illustrations of different styles are given in this paper. You should by all means have one or two if you can afford it. They are high in price, ranging from two shillings and sixpence and upwards. Many people cannot afford ornamental pots or vases at those prices, and regret the want of them, for they are really handsome ornaments. I need scarcely



say anything to you about cut-flower vases. There are few homes without a small vase or two for holding cut flowers. They are so easily obtained that it is a pity to see a lovely bouquet stuck into a mug or tea-cup for want of one. Cut-flower vases of glass are now greatly used in dinner-table and drawing-room decorations. They are generally trumpet-shaped, and made in many different styles. The common trumpet glasses are very useful for cut flowers on any

occasion. Hyacinth glasses are elegant ornaments when filled with nicely-grown hyacinth bulbs in flower. The common glass ones are

very cheap; a more elegant and expensive style has lately come into great repute, made of coloured glass or Etruscan ware. You will find it very interesting to grow, perhaps, a couple of hyacinths in glasses. Plants in a room should have ornamental covers for the pots; you can purchase expansive wooden ones from the seedsman. They are very pretty, and hide the unsightliness of a common pot from view in the favoured domain of your parlour. You can obtain them either plain, coloured, or gilded; and they will expand to suit the size of any pot, or fold up into small compass



when not in use. You can also obtain an improved form, ornamented with imitation foliage. They are all very durable and moderate in price. A very pretty and serviceable pot cover could be made with cardboard, which you could ornament to your taste. A cardboard pot cover when ornamented with sea-weed and shells looks extremely pretty.

(To be continued.)



HOME-MADE ASPHALTE WALKS.



NUMBER of inquiries have been from time to time made as to the formation and durability of asphalte walks, and we propose to offer some information on these points. For kitchen gardens, or courts, or anywhere where a clean, smooth, durable path is an object, there is hardly anything better than asphalte when properly laid down. Weeds never grow upon it, which is a vast consideration in a kitchen garden; every shower of rain washes it as clean as a well-swept kitchen floor; it has no offensive smell after it has been down for a few weeks; and it will last under the usual garden traffic for twenty or thirty years. We are well acquainted with kitchen gardens where all the walks are asphaltered; they have been laid down for many years, and are as smooth and even at this day as they were at the beginning. Some of the shady walks amongst the shrubberies, where weeds used to grow too fast, are also done in this way, and have long ago become covered with a fine green moss, on which one treads as silently as on a carpet, but no weeds grow on them. We are not here speaking of asphalte put down by regular asphalters, but of work done by the ordinary labourers on the estate, at very little expense and trouble, as we are prepared to state that the walks look just as well as those put down by the asphalters, and are, if anything, more lasting. The regular tradesman, who does the work by contract at from eightpence to a shilling per square yard, perhaps—finding all the materials—puts too thin a “cake” on, and the consequence is, that the frost breaks it up, rends it in every direction, and then it has to be done over again, for asphalte does not patch well. We have put down in our time many hundreds of yards of asphalte with our own men, and it cost us little more than the gas-tar, which can sometimes be had from the nearest gasometer for a trifle, and a few barrels will soak a great quantity of ashes. Usually a good deal of trouble is gone to in draining and bottoming the walks, and in putting the asphalte on at twice; but all this work and the boiling of the tar we have proved to be quite unnecessary, for our purpose at least. With two or three good labourers, the ashes are sifted, soaked, put on, rolled, and finished in a very short time. As to drainage, it must be remembered that the water runs off the walks, and does not drain away; so that all that is necessary is a single drain along one side of the walk, into which the water is taken by gratings at convenient places. No rubble bottom whatever is put in. If the soil is tolerably hard and solid, the asphalte is just put on it as it is, saving the cutting and making of the edges, and a walk so made is just as good as one with a foot of broken stones beneath it. The best season for the work is in autumn, when the heat of the summer is over, and the frosts have not set in; or in spring, after the frost has gone, and before the heat comes on. The reason of this is, that in hot weather the asphalte does not set so readily, and in frosty weather it is apt to be disturbed and broken up before it does set.

And now as to the *modus operandi*. First of all, the walks must be set out and got in readiness, and then the ashes—usually plentiful about a garden—must be sifted. Two men will sift as many in two days as will cover a great stretch of ground. A one-inch sieve or screen must be used. If the ashes are put through a wider mesh than this, they are too lumpy, and do not bed well; and if through a less, they contain too much small, and the “cake” is too soft and yielding. They should be thrown into a circular flat heap about two feet deep when sifted, and the tar should be led and emptied over them at once—about as much as will soak them the first time without draining away to waste, which is a matter of judgment at the time. It is better to give too much, however, than too little, as what tar runs through can be ladled up and poured on again until the ashes absorb it all, which they take a little time to do. As soon as the tar has been emptied on, however, the heap must be turned at once, and turned again, mixing the wet with the dry ashes as the work proceeds, so as to soak up the tar as much as possible; and when finished, the heaps should be thrown into a conical shape, and left to soak for about a week, when the ashes will appear much drier than they were when turned, in consequence of the tar soaking into the cinders more completely. This is the reason of applying the tar twice. If the whole is put on at one time, the half of it will run off, and after the ashes have been put on the walk they will dry and break up like a macadamised road in dry weather. The first dose of tar saturates the cinders, and the second makes them sticky. At the end of a week the second dose must be given, the heap turned as before, and again left for several days. The drainings may be poured back on the heap again; but if the tar persists in draining through, it is better to let it run away, or use it on another heap; for the ashes must not be puddly, or dripping with the tar, but, as we have said before, sticky only, and no more, otherwise the walk will not set so hard. When it is seen that the material is in this condition, wheel off on to the walk, and spread it about four inches deep, and level it as it is put on with the back of a rake, leaving an even surface, and taking care that the walk is slightly rounded towards the centre, in order to throw the water off to the sides. As soon as all has been put on, roll it with a wet roller two or three times, and keep the roller clean with a besom as it goes along. The usual way is for two men to pull the roller, and one to go behind with a besom, all taking care how they put their feet down. After this, sprinkle the surface with gravel or spar, put through a half-inch sieve, so thickly, as just to hide the asphalte, and roll again for three or four hours, till it is quite firm, and continue the rolling for an hour or two every morning when it is cool, for three or four days. If the work has been done with ordinary care, the walk is fit for traffic as soon as it is finished, and is perfectly clean to the feet. If the gravel has been put on thick enough, it makes a clean, dry surface at once, and keeps its colour perfectly. If more happens to be sprinkled on than will roll in to stick, it can be easily swept off afterwards, when the asphalte has set fairly. A walk finished in this way—and it must be sprinkled with something—has just the appearance of a

gravel walk smoothly rolled. As regards edgings for asphalte walks, we are aware that the belief exists that box and other living edgings will not grow near gas tar; but this is not the case. We could point to gardens where hundreds of yards of box are growing close to the asphalte, and all other kinds of edgings thrive well enough. It is only necessary to plant the edgings after the asphalte has been put down and is set; and this is not a difficult matter, as the asphalte can be put down and rolled with the utmost exactness, and the edgings can be planted close up to it.

THE CINERARIA.



THE seed of the Cineraria should be sown in autumn, and as soon as the produce can be handled, they should be potted separately into a soil composed of loam, leaf-mould, and silver sand, in about equal proportions. The young plants are preserved best in a low, cold pit, so that they may stand on the floor and yet be near the glass. The reason for this is, that though they require to be constantly and moderately moist, still the frequent application of fresh water is found to be injurious, and on this account fire-heat is to be avoided, as having a tendency to dry the soil, taking care, however, to preserve them unscathed by frost. It is on the condition of the plants through the winter part of the year that the flowering of the succeeding spring mainly depends, for if not perfectly healthy now, it is almost hopeless to expect vigorous bloom. About the beginning of February they should be removed into larger pots, and a stronger soil than that recommended for the first potting. The loam and leaf-mould may be continued as before, but instead of sand, well-rotted manure should be used in the same proportion. At the same time a quantity of seed may be sown in gentle heat, to supply plants for bedding-out in the flower garden; those will continue to produce flowers from the beginning of June till they are cut off by the autumnal frosts. Those that are in pots should be kept, after their final potting, in the same kind of pit until the flowers are just expanding, when the greenhouse or other place they are intended to decorate should of course receive them. Throughout the entire existence of the plants, they should be guarded from drought and the attacks of green fly, to which they are very subject; fumigation and washing with tobacco water are the most effective means of clearing them from the latter. It will sometimes happen that though the plants may bloom most abundantly, they do not perfect seed; the mode of obviating this difficulty is to stand the plants in a very cool, shaded place through the summer, when they produce it in abundance. After flowering, the old stems should be cut away, and the stools shifted back into small pots, preserving them through the winter in the manner advised for seedling.

January.

SOLANUM PSEUDOCAPSICUM.



THE large-berried varieties of *Solanum pseudocapsicum* are invaluable for conservatory and sideboard decoration in the late autumn and winter months. Few cultivators do justice to these plants, and hence we rarely see such dense, well-berried, and symmetrical plants as the one here figured. The principal secret in the management is to plant them out early in May in a sunny spot, in light rich soil, and



encourage early growth by means of regular supplies of water. They may be once stopped in June. In October they must be taken up and carefully potted, and put into the greenhouse to ripen the berries.

THE CONSTRUCTION OF ROCKWORK.



IN constructing elevated mounds for ferns and alpines, the base should be of building rubbish, faced with burrs from the brick-kilns, or with large blocks of stone or flint, if such are plentiful in the district. The soil in the lower parts should be a mixture of sandy loam, leaf-mould, and peat for ferns and flowering plants; and in the wet hollows, for marsh ferns, rotten wood should be used plentifully. The higher portions should be built up with additional tiers of brick rubbish, and with a soil composed of sandy loam, old mortar, and leaf-mould in the interstices, as in these higher portions most alpines do well. The summit may be a bed of rich loam, resting on a bottom of rubbish, for ornamental plants of large growth; but a mere mound, the summit of which is below the eye, should be faced all over with large rough blocks of stone or vitrified blocks, with suitable soil between for the plants. To imitate stratified rocks, regular courses of brickwork are the best, to be built up in cliffs and caves, as may be desired, and then the whole faced with Roman cement an eighth of an inch thick, and the stratifications marked as the work proceeds. When weather-stained and suitably planted, rockwork of such a kind, if on a somewhat large scale, has a natural and imposing effect; but for small mounds and banks, vitrified bricks or flints, roughly arranged in a few bold curves, are by far the best. A north aspect is the best for most ferns and alpines.

Artificial coral for rockwork can be made as follows—Take four parts of yellow rosin and one part of vermilion, and melt them together; dip twigs, cinders, or stones in this mixture, and it will give them the appearance of coral, and they become applicable to rockwork, grotto, or any fancy work, as a substitute for that costly article.

MANAGEMENT OF PLANTS IN ROOMS.



OF treat of the proper management of plants in houses is a subject attended with considerable difficulty, every genus requiring some variation, both in soil and general treatment. If the room where the plants are intended to be placed is dark and close, but few will ever thrive in it; if, on the contrary, it is light and airy, with the windows in a suitable aspect to receive the sun, plants will do nearly as well as in a greenhouse. But if they are observed to suffer, the effects may generally be traced to one of the four following causes:—Want of proper light and air, injudicious watering, dust or dirt collected on the leaves, or being potted in unsuitable soil.

Want of proper light and air is, perhaps, the most essential point of any to be considered; for, however well all other requisites are attended to, a deficiency in either of these will cause the plants to grow weak and sickly. Let them always be placed as near the light

as they can conveniently stand, and receive as much air as can be admitted when the weather will allow. Indeed, those persons who have no other conveniency than the house to keep them in will find that they derive immense advantage from being, during fine weather, in spring and autumn, turned out of doors in the evening, and taken in again in the morning, the night-dews contributing greatly to their health and vigour.

Injurious watering does more injury to plants in rooms than many persons imagine. To prevent the soil ever having a dry appearance is an object of importance in the estimation of very many; they therefore water to such an excess, that the mould becomes sodden, and the roots consequently perish. Others, to avoid this evil, run exactly into the opposite extreme, and scarcely give sufficient to sustain life. This, however, is by no means so common a practice as that of giving too much; for, in general, if anything appears to be the matter with the plants, large doses of water are immediately resorted to; and if recovery is not speedy, this nostrum is again administered, with but little doubt of its infallible restorative powers. But such persons, like an unskilful physician who gluts the weakly stomach of his patient, only hasten on what they are trying to prevent. This overplus of water will show its bad effects by the very dark colour and flabby disposition of the leaves; and if the plant receives too little, the leaves will turn yellow, and eventually die.

The best plan is to always allow the soil in the pot to have the appearance of dryness (but never sufficiently to make the plant flag) before a supply of water is given, which should then be pretty copious; but always empty it out of the pan or feeder in which the pot stands, as soon as the soil is properly drained. The water used for the purpose ought always to be made about the same temperature as the room in which the plants grow. Never use it fresh from the pump; either let it stand in a warm room all night, or take off the chill by adding a little warm water to it, or the growth of the plants will be much checked.

Matter collected on the leaves may either arise from insects or dust. The former may speedily be remedied by placing the plants under a hand-glass, or anything that is convenient, and burning some tobacco until they become well enveloped in the smoke; and the latter may be removed by occasionally washing them on the head with pure water, either by means of a syringe, the rose of a watering-pot, or with a sponge, should the dirt still adhere.

Being potted in unsuitable soil is by far the most difficult part of the business to rectify, for no certain line can be drawn unless each genus was treated on separately. However, as this cannot be done in a paper like the present, a few general remarks, which, perhaps, with some little exceptions, may be found to be pretty correct, must suffice. All plants whose branches are fragile or slender, and roots of a fine, thready, fibrous texture, with general habits like the *Ericas*, will require the same soil (peat-earth) and very similar treatment to Cape-heaths. Those whose wood and general habits partially differ, and whose roots are of a stronger texture, as *Acacia*,

Ardisia, *Stenocarpus*, *Tetrachea*, *Tristanea*, etc., will require a portion of sandy loam—in many cases about equal parts; and where the habits, etc., differ materially from the heath, only a small portion of peat-earth will be required, and a compost may be made a little rich by the addition of well-rotted dung.

Almost all Cape and other bulbs, as *Sparaxis*, *Ixia*, *Gladiolus*, *Tritonia*, etc., thrive best in a mixture of light, rich sandy loam, leaf-mould, and a little peat.

Shrubby and herbaceous plants, with luxuriant roots and branches, as several species of *Myrtus*, *Jasminum*, *Hibiscus*, *Hermannia*, *Heliotropium*, etc., require rich loam, lightened with leaf-soil, without any portion of peat.

Plants with powerful roots, and but slender heads, as *Veronica*, *Senecia*, *Scutellaria*, *Ruellia*, *Maurandia*, etc., require a light, sandy soil, mixed with a small portion of leaf-mould and very rotten dung. At the time of potting, always lay plenty of broken potsherds at the bottom of each pot, to give a good drainage.

It will be seen that these directions do not allude to either orchideous, succulent, or aquatic plants. Many of the orchideæ require a portion of decayed wood mixing with the soil; others grow in damp moss; but these, being chiefly stove-plants, will not flourish in a room. There are several species, however, that thrive very well both in the greenhouse and in rooms, as *Arcthusa*, *Calopogon*, *Dendrobium*, *Ophrys*, etc. The soil suitable for these is a mixture of about equal parts of light sandy loam and peat. Very little or no water must be given when they are not in a growing state.

Succulent plants of all descriptions require very little water, and in general are very easily managed in rooms. Many of them thrive in a mixture of sandy soil and lime rubbish, as *Aloe*, *Cacalia*, *Cactus*, *Aizoon*, etc.; others grow well in a mixture of equal parts of light sandy loam and peat, as *Coris*, *Cotyledon*, *Mesembryanthemum*, etc. The proper soil for the *Geranium* is half rich, rotted manure, a fourth fresh yellow loam, and a fourth of equal parts of good garden mould and leaf-soil.

Aquatic plants, as *Villarsia*, *Actinocarpus*, etc., generally do well in a mixture of peat and loam, and require to be constantly kept in a wet state. Indeed, the best way is to place the pot in a deep pan, or feeder, which should always be kept filled with water.

Bulbs of most sorts flourish in rooms with less care than most other kinds of plants. Hyacinths should be planted in autumn. In preparing pots for them, select such as are about four inches deep and three inches wide, put a little rotten dung in each pot, fill each pot up with light, rich soil, and plant the bulbs so shallow, that nearly half the bulb stands above the soil; plunge the pots in the open air, and cover them six or eight inches deep with rotten bark. During spring take them out as they are wanted to bring into flower, and set them in the window of a warm room, where they will be fully exposed to the sun. Those who do not possess a garden may set the pots in a cellar or outhouse, or in the corner of a yard, and cover them with light soil or sand, until they are wanted to bring into the room to flower. When the leaves begin to decay, after they

have done flowering, give them no water; when the leaves are dead, take them out of the soil, and remove the offsets, and lay them in an airy situation until the time of planting.

If grown in water-glasses, they require to be placed in a light, airy situation, and the water will require to be changed once in three or four days. If drawn up weakly, it will be necessary to support the stems. This, however, will not be necessary if they be kept in a light and airy situation. When out of flower, plant them in pots of soil to perfect their leaves, and treat them as above; they will then flower again the succeeding year.

GRAPE VINES IN POTS.



GRAPES grown in pots for forcing, when well furnished with fruit, have a beautiful appearance, and when properly grown make an ample return. For this purpose the plants should be raised from "single eyes," or a piece of the preceding year's wood with only one joint, taken off at the spring pruning, and placed in a small pot of sandy earth, setting it in the vinery, where it will progress at nearly the same rate as the parent plant. As soon as it has filled the pot with roots, it should be shifted into a larger one; and if everything goes on favourably, it will require to be again removed, this time into the fruiting-pot, which should not be less than fifteen inches over; and here it will require to establish itself before winter, that it may be in a fit state for resting until the succeeding year, then it must be cut back to within four or five joints of the pot, and afterwards be subject to the same treatment as the mature specimens. It will usually produce three or four bunches the first year, and by pruning back to three joints annually, and supplying the roots with fresh mould when first started, and liquid manure at their most active season, the plants will continue fruitful a long time.

CONSTRUCTION OF THE GARDEN FRAME.



THERE are three sizes of which garden frames are always formed, and they are severally distinguished by the names of *one-light*, *two-light*, and *three-light* boxes or frames, corresponding to the number of lights or sashes of which they are composed. The first two sizes are generally employed by nurserymen and market gardeners, chiefly as beds in which to raise tender seeds, or for protecting delicate exotics, and they are thus constructed to be convenient for removal from place to place, as circumstances may require; but for all purposes of utility, as regards the necessities of the amateur gardener, and its application to the system of management which we are about to describe, the *three-light* frame is the most suitable. Where, how-

ever, the extent of operations is very limited, the *two-light* frame will perhaps be found more convenient. The dimensions of the *three-light* frame are generally ten feet long and four feet wide; fifteen inches deep at the back, and sloping to seven inches deep at the front; but here we would recommend an alteration in the depth from fifteen to eighteen inches at the back, and from seven to ten in the front, as these will better suit general purposes. The shallow frames are well adapted for early forcing; indeed, better so than the deeper, for in dark and cloudy weather, the atmosphere being thick, the insufficiency of light requires that the plants should be near the glass. But for general purposes we prefer the greater depth, as at any time, if the lesser depth should be required, it can easily be obtained by simply raising the soil on the inside of the frame. The wood of which the frame is composed should be inch and a half deal, well planed and dovetailed together at the joints; the tops should be tied together by two cross-pieces three inches wide, which should be dovetailed, one end into the back and the other into the front, and so placed that they will come exactly under where the lights converge to each other. These cross-pieces should have a groove running the whole length up the centre of their upper surface, for the purpose of carrying off any water that may lodge between the lights.

At each end of the frame there should be a piece or slip of wood, three-quarters of an inch thick and about four inches broad, nailed on so as the upper edge will be level with the upper surface of the light. The object of this is to prevent the entrance of cold winds, which are apt to blow under the lights. The lights should be four feet long, and three feet four inches wide, and glazed with strong sixteen-ounce sheet glass, which is now so cheap as to be obtained in large squares, at almost any respectable glass warehouse, for three-pence per foot. We would direct particular attention to this part of the work, as the tradesmen are very apt, notwithstanding the cheapness of glass, to make use of small squares of the thin crown glass, which is not near so durable. We would not, however, recommend too large squares, neither would we sanction, as some have, to putty the laps, but, on the contrary, to have rather narrow, say, six-inch squares, and the laps left open, so as to admit of the steam being evaporated, and also to allow the condensed moisture to escape, which, under other circumstances, would be retained on the interior surface of the glass, and keep up a continual drip and humidity, which would eventually, in dull and damp weather, rot the foliage and young shoots of whatever plants were contained in the frame; besides, in the event of an accident, when the glass is small, the damage is more easily repaired. When the frame is completed, it should be painted white on the inside, and a dark leaden colour on the outside. The advantage of having the inside painted white is the great additional light which it gives, and the benefit which thereby accrues to the plants.

PROTECTION FOR PITS AND FRAMES.



HAT some kind of protection is necessary where pits and frames exist, and that such protection forms a considerable item in the garden account, will, we are sure, not be denied; then to preserve such covering in an efficient state for as long a time as possible must be a matter of concern to all who possess structures requiring it. The accompanying engravings will show how this may be done, and the neatness of the frame-ground be secured, and the confusion which mats, bass, etc., laying about to dry, produces, be avoided.

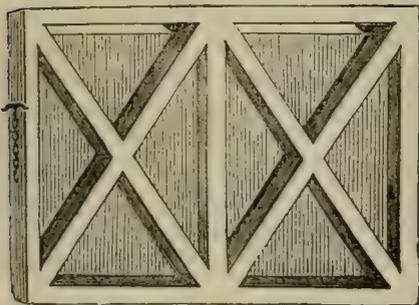


FIG. 1.

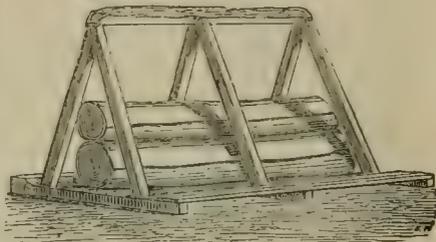
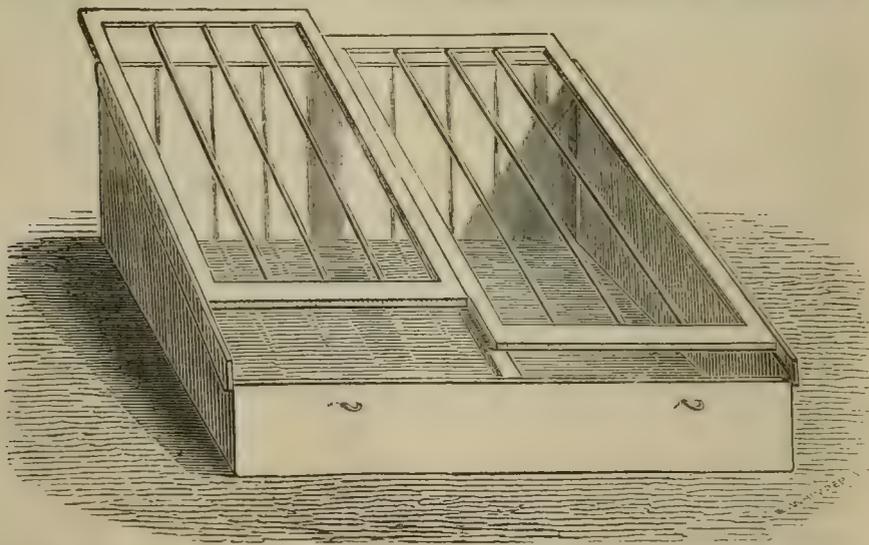


FIG. 2.

Fig. 1 represents a skeleton frame, made the size of a frame-light, with diagonal braces, and bound at the corners with iron hoop; and at each end is a small chain with T-link, to drop into a staple fixed in the frame or pit, by which means the frames are secured in



their places. The scantling of timber used is 2 inches by $1\frac{1}{2}$ inch, upon which is strained stout canvas, projecting over one end of the frame, so that when more than one is required, the projecting edge laps over the next light, and keeps the wet from going between.

After it is strained upon the frame, it should be well painted—the frame should have been painted before.

Fig. 2 represents a rack upon which the lights are stored when not in use, and may be made to hold any number required; underneath which, the mats, frigo-domo, etc., when tightly rolled, are put, and consequently will be always dry. The timber used for the rack must, of course, be much larger scantling than that for the frames.

CULTIVATION OF THE MELON.



THE melon is naturally a more robust plant than its ally, the cucumber, and so far as growing it is concerned, of much easier management; indeed, plants of the melon might be kept with ease where cucumbers would perish; and from this it might be inferred that their fruit should be produced at an earlier period than usual, and so it might, was it not for the absence of sufficient sun-heat to give the requisite flavour to the fruit in its ripening process: it could be had in a green state at any time much easier than its relative, but then in winter it would be useless, and hence the reason that we have to wait till April or May for its maturity. On this account it is not advisable to begin the cultivation of the season's crop of melons before the beginning of February; these will, under good management and a propitious season, produce ripe fruit by the end of April, and a bed made up successively in each month till July, will give a continued supply throughout the summer and autumn.

Melons are usually grown either in common hotbed frames or pits, artificially heated by means of fermenting material, such as fresh stable dung, or a circulation of hot water; the latter is far preferable, because of its greater regularity, more certain and manageable, with half the labour than the best of ordinary hotbeds, and its consequent economy, especially for the earliest crops, when everything depends on a steady continued application of the requisite amount of heat. The seed of melons will vegetate at a very great age; plants have been reared from some known to be nineteen years old, and it is generally preferred when saved for three or four years. It should be sown in pots of light rich earth, and shifted singly into small ones as soon as the rough leaves appear. A temperature of 65° or 70° will grow the young plants in the best manner, and when they have attained two or three true leaves, they will be in a fit condition for final planting. The mould forming the bed intended to receive them should consist of a rich holding loam, lightened just where the plants are to be first stationed with a little leaf-mould, that their young fibres may be encouraged to enter it freely.

The melon is a gross feeder, and from the number and size of the leaves on a full-grown plant, it is evident that a plentiful supply of food will be required, and hence the advantage of employing stiff loam, which absorbs and retains more moisture for a longer period

than any light soil possibly can; the depth of soil, whether it is placed over a common dung-bed, or if the warmth is supplied by a hot-water apparatus, should not in either case be less than a foot, or exceed eighteen inches, and the whole may be placed in a frame at once, or added at intervals, as convenience may dictate. The temperature of a newly-planted bed should average 80° at bottom or among the soil, with a surface heat of 65° at night, rising to 75° or 80° in the day. Of course a proportionate amount of moisture must be present, and the best evidence of the most desirable quantity will be given in a deposit of dew-drops round the edges of the foliage, when the lights are uncovered in the morning; so long as this is observed and it is afterwards dried off in the course of the day, the cultivator may rest assured his plants are progressing favourably. The vine or stem should not be stopped till it has grown nearly to the extent of the space allotted to it, and has begun to throw out lateral branches; it is these that will bear the future fruit, and as soon as female blossoms are expanded, they should be carefully fertilized with the pollen from the male flowers. They are easily distinguished from the other by the embryo fruit attached to the former. Male flowers are usually produced first; those which open before there is a probability of the expansion of the other class may be taken off to economize the vigour of the plants.

When fruit is beginning to swell, the shoot on which it is growing should be foreshortened, by pinching off the terminal bud, and removing all other younger fruit, leaving nothing on the branch but the principal one, and about two leaves beyond it. Such branches as do not promise to bear fruit, should be cut back to within two or three joints of their origin, that they may protrude other branches likely to be fruitful, and by judicious management in this respect a very good second crop may be obtained from the same vine.

There is a considerable difference in the fruitfulness of the various kinds; some of the larger sorts do not set more than two or three fruit, while others will bear five or six times that number. Half-a-dozen may be considered a fair crop of ordinary-sized melons from a single plant, and it is not advisable to leave a much greater number, even though they should be produced, as, in the case of an excessively heavy crop, the flavour will, in all probability, be deteriorated.

One of the greatest difficulties opposing the progress of these plants, especially of the middle and later crops, is the destructive attacks of red spider, so common in hot weather. To guard against this every endeavour must be made to keep a damp atmosphere about the plants up to the time the fruit is just ripening; the whole of the foliage should be sprinkled over every evening in dry weather, and liberal applications of water to the roots must be frequently given, and even then the insects will sometimes make their appearance. As soon as they are observed, the underside of the leaves on which they are, should be dusted over with sulphur, and in the middle of the afternoon the beds should be watered, and the lights shut close, in order, by raising the temperature, to create a vapour

and generate a strong fume from the sulphur. This course must be repeated daily until they are eradicated; for if allowed to get any head, the further production of fruit will be entirely prevented, and that which is already formed will be without flavour and worthless.

When about half grown, a piece of tile or glass should be placed under each fruit, to keep it from the damp mould and allow it to become properly coloured on the underside; and it is a good plan to lay large stones almost close together over the entire surface of the bed, as they tend to keep the roots moist, and, by the refraction of the sun's rays, assist in heightening the temperature of the bed. A temperature of 75° or 80° is sufficient to ripen the ordinary class of melons.

THE CULTIVATION OF THE GLOXINIA.

BY G. YOUNG.



TO begin with propagation, select strong healthy leaves, cut the strong ribs in several places, lay the leaves flat on a convenient sized pot or seed-pan, and cover the several cut parts with a little white or silver sand, using a compost of sand and peat-mould. When struck and swelled to the size of a pea, pot off into sixty-sized pots, using a compost of dead leaf-mould, light loam, and sand in equal parts. Grow them on through the season, and most of them will flower the first year.

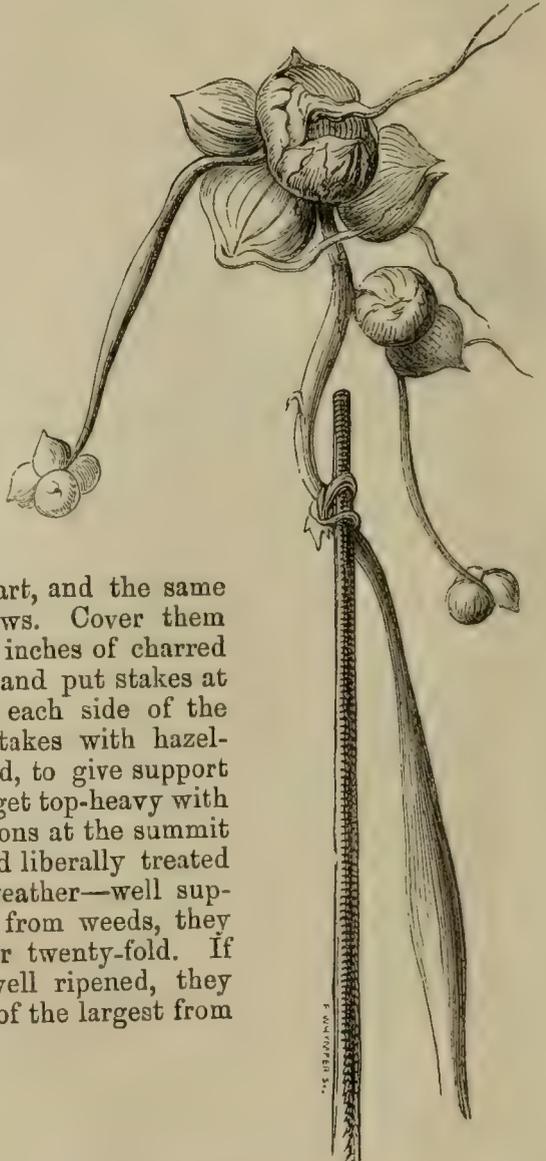
To commence the second season's growth, in potting Gloxinias, the principal part of the old soil should be removed carefully with the hand, retaining all the fibrous roots as far as they are alive. Put into as small pots as possible, setting them in a dry part of the stove. Attend to watering, but this element must be supplied cautiously at first, taking care not to water over the crown of the plant, but round the edge of the pot. As the plant advances in growth, it may occasionally be syringed with tepid water; when the pot becomes filled with roots, shift the plants, using the same soil as before. As the spring advances, the plants must be started into active growth by being placed in the warmest part of the stove, but it will be necessary they should have air at all favourable times. Particularly attend to watering at this time, as they are very impatient of being dry at this stage of their growth. When the plants have filled the pots with roots, they may receive their last shift, the size pots may be regulated according to the size of the plants, allowing plenty of room for the roots to develop themselves, otherwise a profusion of bloom and large flowers cannot be expected. Manure water may be used to great advantage at this season. I should have mentioned that it is particularly necessary to well drain the pots with potsherds and rubble, with a covering of rough soil, as nothing is more injurious than stagnated water at the roots. When the flowering season begins and the flowers expand, remove the plants to the greenhouse, taking care to shade them from the sun.

When the flowering season is over, return them to the stove, and set them in the coldest part; reduce the water by degrees until the roots are in a state of rest, for three or four months at least. Be careful not to over-dry them, as by such practice I have often found them not to break the next season.

THE TREE-ONION.



THE tree-onion is remarkable for reproducing itself by offsets, which it bears at the top among, or instead of, the umbel of flowers. They should be planted at once, or as soon as the weather permits. The ground should be liberally manured, and trod firm. Choose for planting the largest of the top bulbs, which are generally over an inch in diameter. Press these down firmly in a line about six inches apart, and the same distance between the rows. Cover them over with three or four inches of charred rubbish, ashes, or sand, and put stakes at about a yard apart on each side of the rows, connecting the stakes with hazel-ropes, laths, wires, or cord, to give support to the stems when they get top-heavy with their curious crop of onions at the summit of each. In good soil, and liberally treated—as watering in dry weather—well supported, and kept clean from weeds, they will increase every year twenty-fold. If the ground bulbs are well ripened, they may be planted instead of the largest from the top cluster.



PRUNING THE GRAPE-VINE.



HERE are but two distinct methods of pruning the grape-vine; these are the "spur" and "long-rod" systems. By the first, the fruit is produced from shortened branches proceeding from an old or principal branch, or from the main stem of the vine; by the other method, the wood or branches which bore fruit the preceding year is entirely cut away, and young branches trained in its place, for the production of berries in the current season. The first is most usually employed, because the simplest, though each has its peculiar advantages. The main stem of a young plant, no matter what the future mode of training is to be, should be first carried in a perpendicular manner to the required height, and if it attains this at an early part of the season, should then be bent downwards, in order to induce a branch from the curved part; or if it is near the end of the season, should be cut over at the part, the object in both cases being to gain two laterally spreading arms which shall extend from the principal stem in the form of a T; from these two, other perpendicular branches, which are ultimately to form the fruit-bearing portion of the tree, are to proceed at intervals at not less than eighteen inches, and that the head may be regularly formed, particular attention must be given to the buds of the laterally extending branches at the time they are about to start, removing those which are badly placed, and bending the ends of those arms down so that the shoots from near their bases may be formed first, for if allowed to grow at their own pleasure, it is most likely that the terminal buds will break first, and there will be consequently much trouble to get the middle of the head filled.

Having obtained the required amount of rods from the horizontal branches at the proper distances, in the third season from planting will begin the pruning; if the "spur" system is preferred, the rods will only require to be carried upwards as far as they will grow, and all the rods left untouched, merely pinching off the points of those laterals which produce fruit, which should be done under all circumstances when they have grown about four joints beyond the bunch. In the autumn these side-shoots, which are to form the spurs, are to be cut back to within two or three joints of their origin, and the repetition of these courses annually constitutes the spur system, by which the principal rod supporting the spurs remains for years, while by the other mode of pruning it is removed every season.

The only trouble attached to the long-rod method is to provide a fruit-bearing branch, that shall proceed from the bottom of the head, it being sometimes difficult to make them break with vigour from the particular part desired; and in order to facilitate this emission, it is necessary to keep the existing branch bent downwards till the future one has fairly broken, and then to check all others that seem likely to rival it in strength. The matured rod of the preceding year's formation will produce fruit from nearly every joint of its length, and by stopping the points of the shoots which carry the

bunches and preventing any others, the new rod will be encouraged to grow, and by the end of the season will have attained a length equal to that of its parent. At the pruning season the latter will in due course be cut completely away, leaving only its offspring to occupy the space it formerly filled. Thus there are no spurs, and consequently less foliage, which makes the method desirable for houses in which other plants have to be grown beneath the vines, whose shade is often a great objection.

The period at which grape-vines should be pruned will depend upon their position, or rather on that at which it is intended they shall begin to grow. It should always be done at least a month before the time the buds are likely to swell, for if left till the seasonal action of the plant begins, even though no sign of it may appear above-ground, all the cuts then made will be found to exude sap, and the drain thus made upon the system of the plant will very materially injure it, if death does not ensue.

PROPAGATION OF FERNS.



FERNS are only found in the most favoured spots, where moisture, warmth, shade, and shelter combine. They do not, however, require a great quantity of nourishment, as they by no means affect rich soils; but, on the contrary, old walls, the fissures of moist, shady rocks, and the stumps of old trees, are the situations where they flourish, and particularly in warm climates, where they are found in great abundance. It seems to have been a vulgar opinion of great antiquity that ferns do not produce seed. Their seeds (spores) being too minute to be distinctly observed by the unassisted eye doubtless gave birth to that opinion; nor does it appear that any attempt to raise plants by this means was made till towards the end of the seventeenth century; but the fact has been since established, beyond the possibility of a doubt, by numerous experiments. The mode of germination in these spores is, however, as different from that of other vegetables as their method of producing them. They are generally produced in clusters or lines on the back of the frond; but although several hundred thousand may be found on a single frond of some ferns, it seems they will not produce plants except under very favourable circumstances. Hence, the more common mode of propagating them is by lateral offsets, which are frequently produced by the tuberous-rooted species; and the creeping-rooted kinds produce their single fronds, and increase with still greater facility.

POULTRY FEEDING.



POULTRY of all kinds relish green food, and do not long continue in health without it. Leaves of cabbage, turnip, and the general waste of the garden, should be thrown to them, along with scraps from the house, and insects. The run of a paddock is excellent, and in a straw-yard they find plenty to eat, and employ themselves in scratching, which promotes their health and happiness.

The great difficulty with most people who keep fowls is to spare them sufficient room for a good run; and where a well-kept garden is desired, the birds are cooped up in a small enclosure, where they cannot prosper, and at last are voted expensive and troublesome, and got rid of as a failure. But a better way is to rail off a good-sized piece of ground, and let the fowls have free range over it, to pick and scratch as they please. But this patch need not be lost, as to the growing of garden crops, for there are many which fowls will not touch, and to these it should be, in a measure, appropriated. To supply them with green food, plant in it a row of kale, or any kind of cabbage; and if supplied with sufficient green food that they like, the remainder may be appropriated to Jerusalem artichokes, potatoes, broad beans, parsnips, rhubarb, carrots, parsley, and any other pot herbs. Kidney beans they will destroy as soon as the pods are ripe, but not before; so they may also be grown in the poultry run, as may also vegetable marrows, pumpkins, onions, lettuces, and turnips; but the last five are apt to be scratched up when young, and may need the protection of a net, or coop, or a few hurdles round the beds in their earlier stages; but when strong the protection may be removed. Of course, the poultry-yard will not be the tidiest part of the garden, but a compromise is better than doing an injustice to the birds, and it may be effected without a total sacrifice to them of the ground they require to have sufficient liberty to prosper. Plenty of clean water, gravel, and broken oyster-shells, or old mortar, should be kept in all poultry yards as indispensable. Without lime in some shape fowls will not lay so many eggs as if well supplied with it.

Turkeys are profitable only on good farms, where they pay well, but many who are not farmers have a fancy for them. A good run is essential; they will not bear confinement. They prefer to roost in trees, but in any case the roost must be high, and the nesting-places should be in the most retired part of the shed. When sitting, it is well to remove the cock, for he is apt to disturb the hen, and is sometimes spiteful to the poults. The best food for the young is chopped boiled eggs and bread, a little moistened for the first few days, after which any soft food of a wholesome kind will do, with, once a week, a little cayenne pepper added, with at all times plenty of water. In fattening there is not the least need of "cramming," to produce good birds for table. Shut them up close, and give plenty of meal, with boiled potatoes and boiled vegetables, but never mix more than they will eat at one time. In a good run they are

capital feeders, and nothing comes amiss to them; they are therefore profitable where the place is suitable for them.

Geese are very productive and profitable on commons; but, in gardens, of little use or value. Water is, however, by no means essential; they do well without it, if they can roam and forage for themselves. Pied birds are the best for stock. The same general treatment as for turkeys suits them; the nest must be on the ground, and there is nothing better than a basket, lined with bay or dry moss. A warm house promotes early broods, and the earlier the young birds can be got the better. Grain of any kind should be the staple food for them; and when fattening, they should have plenty of boiled turnips and boiled potatoes; but "cramming" is to be condemned, as a waste of food, for the production of rank and useless fat.

Ducks are good birds for small holders. A little ditch to paddle in, or even a tub sunk in their run, will serve them almost as well as a pond; but, like other poultry, plenty of room in a paddock is an advantage. Young ducks allowed to run through a kitchen-garden do a vast deal of good, by destroying vermin, and, at the same time, thrive upon the food they get. They are apt to tread down a young crop, and that must be guarded against, by enclosing the bed with some nets or hurdles.

The Aylesbury ducks are the most prized, and are most prolific layers. They are bad mothers, however, and it is best to put the eggs under a cochin hen, and confine the brood for the first week, to keep them from the water. Their first food should be boiled eggs and boiled nettles; then a change to boiled barley, and after that they may feed with the others; but they want little if they can forage for themselves. A good feed twice a-day of boiled grain, with the run of the place, soon fattens them; but they should be shut close the last fortnight, and no insect food allowed them, or their flesh will be rank.

NOTES ON GLADIOLI.

BY WILLIAM GARDINER.



FOR the embellishment of the flower borders during the months of August and September, and for forming a striking feature at the autumnal exhibitions, we have not many flowers to equal the Gladioli. Massive in appearance, and richly coloured, they stand out boldly amongst the herbaceous phloxes, the dahlias, and other subjects with which they are usually associated, and it is quite impossible to see well-developed examples without being strongly impressed with their immense value for home decoration and exhibition. They have long been favourites of mine, and after many years' experience, I feel justified in advising those amateurs who like to have something in their gardens besides geraniums and other summer bedders, to take them

in hand, and grow a moderate number of varieties. The corms of good varieties that have been in commerce some time are cheap enough, but the pick of the newest sorts are as a matter of course expensive, and ought not to be purchased by other than experienced cultivators. As a matter of fact, they are not wanted at all, excepting it be for exhibition purposes, for there are more than sufficient of really good sorts obtainable at a moderate price to produce a most glorious effect in the beds and borders. If no others are grown, I would recommend the showy *Brenchleyensis*, which can be purchased for two or three shillings per dozen, to be planted in groups along the second row in the herbaceous border.

For a private individual, I am considered an extensive grower of gladioli, but, as I rarely exhibit them, it may be said that they are grown for the gratification of self and a select circle of friends. I am convinced that, whether for competitive purposes or for home decoration, no flower evinces its appreciation of good cultivation more forcibly than does the gladiolus. They require an open space where both sun and air can exercise a beneficial influence upon them to maintain a sturdy growth, and they also require a deep mellow soil, which is well drained and rich in fibrous matter, and unless such a soil can be afforded all attempts to grow this flower to perfection must fail. A shallow soil made rich by manure is not so desirable as a deep one, because the bulbs do not want forcing into growth by a rich shallow soil and then come to a dead stop just as the flower-spikes are rising. A good depth of soil is required below the base of the corm, so that when the plant arrives at the most critical stage there may be sufficient nourishment to carry it through a dry hot season without much harm. The last season has fully exemplified the importance of a deep soil, for where the corms were planted in light shallow soils, and but indifferently cared for, they were nearly burnt up with the heat.

Any good mellow loam, made moderately rich by a dressing of short rotten manure, trenched at once two feet deep, will be in grand condition for the reception of the corms at the end of February. For this reason, I have thrown out these suggestions now, because there is no other flower so thoroughly impatient of a close unsweetened soil. By having the intended bed trenched up in December, there is time for it to settle down again before the planting season, and the manure which is incorporated with the soil is in a better condition for the sustenance of the roots. In my rather light soil I am obliged to give a heavy dressing of fibry loam and a very little manure, as the soil is already rich. The loam will last for several years, with a slight addition of rotten manure every year, and the ground turned over two feet deep directly the bulbs are taken up.

If the weather is dry and open, I usually plant about the end of February, for the longer the corms are out of the ground the weaker they flower. The best way to preserve them is to keep them in dry soil in a cellar or some similar place out of the way of the frost. Some growers have told me that in heavy soils they find it necessary to surround the bulbs when planted with silver or other dry sand; but of the value of this practice I am unable to speak, not having

grown them in a heavy soil. I cannot, however, understand the force of the argument that the sand preserves the bulbs from damp, because my acquaintance with the use of sand, when confined below the surface, convinces me that it retains more moisture than the ordinary soil.

The bulbs are planted in a border four feet wide, adjoining an important walk, in the following manner: the first row at one foot from the edge, and another at three feet, so that there is a space of two feet between the rows. The border is rather below the level of the walk, as I find, when they want water, by having the border rather lower than the walk there is no waste of water by its running away at the sides. I have long since learnt that attention to these matters is of vital importance in the saving of labour, and for the well-doing of such plants as require the aid of the water-pot. My border is at all times kept free of weeds, and about the first week in June it has a mulch two inches in thickness of half-rotten manure; and as soon after as the weather becomes hot and dry the plants are watered about twice a week, at the rate of not less than four large water-cans to every square yard, so that the very lowest roots may receive benefit from it. All that now remains to be said is simply, that the flower-spikes must be carefully staked and tied, as soon as they have made sufficient progress to require support. The tops of the stalks should not reach higher than the lowest flower on the spike.

THE JASMINE.



THE word *jasminum* is generally supposed to be derived from two Greek words, signifying violet-scented, or as was observed by Dr. Royle, it may have had its origin in the Arabic name, *Yasmeen*. The common or officinal jasmine is the flower of the palace and the cottage, and has long been esteemed for its fragrance. The French are noted for their numerous compositions of sweet-scented oils, pomades, and essences, and the following are two that are easily made:—

JASMINE POMADE.—Take a frame, formed of four pieces of wood, two inches deep, and one foot square, with a groove arranged to support a piece of glass, which is to form a moveable bottom; on this spread a layer of the following pomade:—Beef suet, one part; lard, three parts. Into this stick fresh jasmine flowers, in different parts, every day, or every other day, for one, two, or three months, or until the pomade is sufficiently scented. In this way, in some of the large manufactories in France, are treated from 2,000 to 5,000 frames, which are piled on each other to a convenient height, by which method the perfume is prevented escaping; or what flies off is absorbed by the surrounding frames.

OIL OF JASMINE.—Take an iron plate, on this place a cotton cloth, imbued with olive oil, then a layer of flowers, and lastly an iron plate; repeat the series as convenient, and change the flowers for fresh ones until a proper scent is imparted; then apply a pressure, collect the oil in glass bottles, and let it rest until fined; lastly, pour off the clean.

MESSRS. SUTTON'S ROOT SHOW.



NOTWITHSTANDING the indifferent season experienced by root-growers, it is somewhat remarkable that the various root shows held within the last season have each and all been on a more extensive scale than in any previous year. This would seem to show that there is a spirit of emulation abroad among root-growers that is, we think, a happy augury for the future of root-growing.

The Messrs. Sutton's show this year was—notwithstanding that the phrase is a hackneyed one—without question the best they have ever had; and it required no very close scrutiny of the well-arranged tubers to see that in numbers they far exceeded those of last year. It was quite a treat to go over the show and note the orderly arrangement of the roots. One feature of the sight was well worth seeing, namely, the interesting little museum which goes under the name of the “model room,” wherein may be seen artistically cast models of all Messrs. Sutton's roots, from the gigantic mangel (the specimens modelled are the heaviest ever grown from Messrs. Sutton's seed) down to apples, peas, and the smaller varieties of farm produce.

First on the prize list came the magnificent root which Messrs. Sutton have not inaptly christened their “champion” swede, a root that has wonderful feeding properties. The entries in this class took up a goodly portion of the space of the roomy hall in which the show was held, and they made altogether a display not often met with. The first prize lot of Messrs. Shaw were neat, the twelve weighing 125 lbs.; the second came very close behind them, as they were an even lot, with great shoulders and good quality; the third of Mr. Farrar were light, but of the best quality. We thought Messrs. Bolckow, Vaughan, and Co.'s highly commended more deserving of fourth position than the lot that were assigned it. The next class for a dozen of the Mammoth Long-red mangel formed a large collection of splendid roots. The first of Sir Paul Hunter's were a useful lot of roots, just perhaps a little coarse on the top, in which feature they appeared to us to be inferior to the second of Mrs. Hay; the third had excellent colour and capital quality in their favour, and decidedly deserved their position. Among the mentioned lots Colonel Loyd Lindsay's were in good condition. The Yellow Globe or Oxheart mangel was another large class. Most of the winners came from the south of England, which would seem to show that the season has been a better one in that part of the country than in the midland and northern counties. The first (Sir Paul Hunter again) were very good for size, and they just beat the second of Lord Calthorpe, which lacked quality somewhat. The class generally might have been commended, as there was hardly a bad lot in it; but we may as well say that Mr. Townsend's commended twelve might have received higher honours. The next class was for the Yellow Intermediate mangels, and to our thinking it ranked, so far as general excellence was concerned, next in merit to the champion swede class. It is a most valuable feeding mangel, and the hard-headed Scotchmen have recognized its good points by

awarding it the Highland Society's gold medal. The first of Mrs. Hay were a splendid lot, and the second of Mr. Clarke, if they wanted weight, were symmetrical in appearance, and had evidently good quality. Of the others it may be remarked generally that they formed a very even show of roots, of capital quality. The Tankard mangels showed up well, as did also the Any Variety class. The Green Globes were headed by a very even lot, shown by Mr. J. Bulford. Coming to the White Globe class one cannot but be struck with the remarkable uniformity of the specimens. It is evidently a good feeding tuber, and, judging from the marked similarity of the exhibits in appearance, must have undergone a very careful "improving" process at the hands of the seedsmen. The second prize lot of Mr. Bulford we fancied might have taken first class, as they had more uniformity and symmetry of form about them than the first, while they were by no means inferior in point of quality. The Duke of Portland's third were a very pretty lot in good heart. The Purple Top Mammoth Turnips were a great show, both for number of entries and quality of the roots. They have good size, and are a good, solid, nutritious-looking root, and should grow well on any soil. The largest in the first prize lot girthed forty inches. The Greystone Turnips are nice coloured roots, and in this respect, as well as in uniformity, the first prize lot of Mr. Bulford quite deserved the position assigned them. For the rest of the large root classes, it is impossible to speak in any but terms of praise, and the taste with which they were arranged in their various classes very much enhanced their appearance.

Cabbages had great size, but were not quite so firm in heart as we should have liked to have seen them. White carrots, on the other hand, were large and of excellent quality.

In the class for Sewage Grown Roots, there was a stiff competition. The best class was that for the Berkshire prize, or Oxheart Yellow Globe mangels, a variety which although only introduced last year, has already made its mark.

The heaviest root of the champion swede weighed $17\frac{1}{4}$ lbs., and was a credit to Mr. Kelsey, so far as size went, but it was not a good-looking root. The heaviest in the Mammoth Long-red mangel scaled 39 lbs., a remarkable weight for a single specimen. The show for the finest specimen prizes was a very creditable one.

Potatoes were good, particularly the Magnum Borum, which is a grand mealy potato, with size and quality to recommend it. The first prize in the class for a half-peck of Any Round Variety was about the best lot we ever remember to have seen of any potatoes.

Vegetables formed a very interesting collection, onions and carrots being conspicuously good.

The large attendance of the public, in spite of the inclemency of the weather, testified to the popularity of the show, which, if it goes on extending in the future as it has done in the past, will encroach upon another flat of Messrs. Sutton's premises, for the one in which this year's show was held, although a large one, was pretty well taken up.

ON THE CULTURE OF THE CYCLAMEN.



GOOD healthy plants, procured now, will probably have commenced growth, and should be kept rather close for a week, when it will be advisable to examine the state of the roots, and if well furnished, shift into pots a size larger; otherwise repair the drainage, and defer shifting until the roots indicate a want of pot room, and then a moderate shift should only be given.

At this season the plants should be placed near the glass, and receive a sufficient supply of water to keep the soil in a nice, moist, healthy condition. Provided frost is excluded, the temperature in which they are grown is of little consequence, except where the plants are wanted in flower without loss of time; and as the blossoms appear before the foliage is well developed, there will be little difficulty in securing these at any period from November to April. Keeping the plants cool and rather dry, will retard their blossoms until March, and placing them in a temperature of from 45° to 50° will bring them into full beauty in a very short time. The plants may be kept in a cold pit, where they will be safe from frost until they commence flowering; and then they should be removed to a sitting-room window, where, with care to protect them from currents of cold air, they will be quite at home, and will be beautiful objects for some two months. The best situation, however, for cyclamens, while growing and in flower, is near the glass in a greenhouse or pit, where the temperature may average from 40° to 50° , and where air can be admitted without its passing over the plants, as in the case in most sitting-room windows.

It is a too common practice to treat cyclamens with neglect directly the beauty of the flower is over, and to give them little attention, and sometimes hardly a drop of water until the following autumn, when they are wanted in flower. This is the very reverse of what they require, and annually occasions the loss of many bulbs. The plants should be allowed a light, airy situation in the greenhouse or pit, and kept properly supplied with water until May, when they may be removed to a shady situation out-of-doors; and when the leaves decay, very little water need be given until it is desired to excite the plants into growth; the soil, however, should never be allowed to become quite dry. Our own practice is to plunge the pots in coal ashes during the summer, which in case of long continued droughts, are watered so as to afford a little moisture to the soil in the pots. The plants should be moved to the greenhouse in September, and surface-dressed or potted as may be necessary.

Propagation is more readily effected by seeds than by any other method, for although large bulbs occasionally produce several large crowns, there is considerable risk in separating them, as decay is apt to follow the track of the knife. Seeds, however, are soon grown into useful plants. They should be collected when ripe, and sown in well-drained pots, filled with a mixture of loam, leaf-soil, and sharp sand, and set in a safe situation till autumn.

January.

They germinate soonest by placing the pots in September in a temperature of about 50°, taking care to keep the soil well supplied with water. If well looked after during winter they will be nice little plants towards April, and may be potted singly in 5-inch pots, taking care not to injure the roots in separating the plants. They should be placed in a close, shady situation until established in their pots, and then set in a light, airy part of the greenhouse. When the weather becomes warm and settled, they may be planted in raised beds of prepared soil on a warm border, and during summer will require no further attention than an occasional watering in case of the soil getting dry, which, however, will seldom occur. In September take them up with as little injury as possible to the roots, and treat them during the winter and spring as recommended for old plants. If managed in the same manner the second summer they will be good-sized bulbs, and will afford an abundance of blossoms the following winter.

Two parts fresh, turfy, friable loam, to one of turfy peat or decayed leaves, with a liberal mixture of sharp sand, form a suitable compost for the cyclamen.

THE GARDEN GUIDE FOR JANUARY.

FLOWER GARDEN.



ANY bulbs not yet planted must be got in at once. Tulips and hyacinths should be kept from frost if possible, though the bulbs are perfectly hardy, yet the flower is likely to be injured by severe frosts, but they should have as much air as possible. Make banks and rockeries. Plant roses, and mulch those already planted with half-rotten dung. Lawns to be attended to, and if bare should be treated to a liberal sowing of good seed. Pansies and polyanthus will need some protection, and see that they are firmly planted in the soil. If not already done, all established plantations should have a heavy mulch of half-rotten dung. Should the weather be mild, hollyhocks may be planted and seed now sown in heat will flower this year, but do not force the young plants too fast. Gravel walks may now be turned. In doing this do not disturb the rough stuff underneath. If the walk has been properly made, there should be a sufficient depth of fine gravel on the surface to admit of it being turned without interfering with the rougher gravel beneath. Walks properly turned can be cleared and kept in good condition for a considerable time. Every cultivator of flowers should secure now a good supply of turf from a loamy pasture, and of bog peat, or silky yellow loam, in which the common brake grows plentifully. Stack these in high ridges, like walls, so that the frost shall penetrate the whole mass, and the grass will rot quickly. All work requiring the barrow should be done during frosty weather, to avoid injury to the walks. Turn over the compost heaps, to let the frost through them; it will destroy vermin and pulverize the stuff.

KITCHEN GARDEN.

Any vacant plots from which the crops have been removed should now be ridged up, so that they may have the benefit of frost. During frost wheel manure on to plots intended for spring crops. Put a heap of half-rotten dung over every stool of rhubarb, and put the pots over those stools intended for forcing, and cover all up with horse-dung, to get a supply of early shoots. Asparagus, seakale, and rhubarb may all be forced in an ordinary hotbed in the following manner: cover the dung with four inches of soil, and take up a lot of strong roots, and put them in pretty close together and cover with leaves, and you will soon have a supply. Asparagus

should never be thoroughly blanched, but allowed to become green at the points. Protect celery with loose litter, and keep it well earthed up. Examine cauliflowers and lettuces, etc., in frames, to see that they are not suffering from damp or too close confinement. Frames should be protected in severe frosts by matting, etc. Sow early peas and broad beans, and towards the end of the month parsnips. The work must be regulated by the weather, and when the ground is not fit to be trodden on, get together all the clippings of hedges, prunings of trees, etc., for charring, and keep the produce under cover for use as required; it forms a most valuable top-dressing for peas and other early crops; it stimulates growth, and prevents attacks of slugs. Should severe weather interfere with earth-work, good work may be found in repairing fences, clearing up litter, collecting rough materials for paths and drains, and burning weeds and refuse.

FRUIT GARDEN

Finish pruning all apple, pear, plum, and other orchard trees, and clean up all affected with blight, and dress with a mixture of lime, soot, and clay. Trees on east walls had better be unnailed to keep them back, the warmth of the wall having a tendency to make them push early, and so suffer hereafter from spring frosts. Prune out-door vines at once; when pruned late they are sure to bleed. Lay down a good coating of surface manure in plantations of strawberries and raspberries, but do not dig it in. Do the same between currant and gooseberry trees, and fork it in, being careful not to injure the roots. In pruning the fruit trees save any scions that may be required for grafting by heeling them in at the foot of the tree they are taken from. They will take all the better for being cut some time before being used. Make ready protecting material for wall trees, for sharp weather often sets in from the east, just as the bloom is expanding.

GREENHOUSE AND CONSERVATORY.

Ventilate whenever weather permits, and drive out damp with fire-heat, but be in no haste to set things going. Should mildew appear on the top shoot of geraniums, cut it at once to a sound joint. Training specimen plants is a pretty task when out-door work is at a stand-still. *Kalmias*, azaleas, camellias, rhododendrons, lilacs, daphnes, roses, etc., may be got into early bloom with a very moderate heat, if the wood was well ripened last year. *Fuchsias*, cinerarias, primulas, and *Cytisuses* will be coming into bloom, and must be closely watched that green-fly does not get hold of the tender shoots. Succulents should be kept quite dry. Examine all the old stakes used as supports to plants in pots, and if decaying, remove them. Train and tie out whatever requires it; revise tallies and labels; keep down green-fly by fumigating, secure composts, pots, crocks, etc., and complete all odd jobs so as to have no hindrances in the busy season. Temperature may be 40° to 45° at night, 50° to 55° by day.

STOVE.

Poinsettia pulcherrima and *Euphorbia jacquiniiflora* may be pushed into flower, and achimenes and gloxinias put in heat for early blooming. Be careful to keep down temperature in general collections, and give air whenever the sun causes the thermometer to rise above the average. Plants that need pruning and repotting should be cut over and left to start before their roots are disturbed. Orchids require much care now to keep them at rest, and at the same time prevent shrivelling. Those that will grow must be assisted, and have fresh rooting material if necessary. Keep constant watch among plants with soft, woolly leaves, to see that they are not too dry, and also not suffering from drip. If mildew appears, increase the temperature. Cucumbers and melons for early use should be got in at once. Temperature for general collections 55° at night, 60° to 65° by day.

PITS AND FRAMES

Must be kept clean and airy, and not a dead leaf should be allowed to remain. Be content just to keep out frost and no more until the end of the month, when a general start may be made of all stock required for bedding out. Do not be in haste to remove protecting materials after severe frost. Let the plants recover themselves in the dark, and should bright sun follow suddenly upon severe weather, add some loose straw, or other light covering, to prevent the warmth reaching the stock too suddenly.

January.

TO CORRESPONDENTS.

AMATEUR GARDENER.—Will the Editor of the *FLORAL WORLD* assist an *Amateur Gardener* with his advice? The shrubs round her garden are grown very high, consequently the lower part of the hedge is very thin, leaving the garden much exposed. The hedge is a thorn one, and the shrubs are planted inside; indeed, they are grown so high that they may fairly be termed trees. An *Amateur Gardener* wishes to know what low-growing shrubs she could plant, as some shrubs will not grow under the droppings of other trees, while some particular kinds will thrive. Would *Rhododendrons* answer? An *Amateur Gardener* objects to cutting the high trees, as they are really handsome, and her object is to thicken the lower part so as to render the garden more private. [If *Amateur Gardener* had given us particulars respecting the extent and situation of her shrubbery, we should have been better able to advise; as it is, we subjoin a list of shrubs, etc., which we think will answer her purpose:—Yellow Azalea grows about three feet high, and bears a yellow flower in May and June; Common Berberis bears an abundance of small oblong red berries, must be cut back occasionally to ensure a bushy habit; Double-flowering Gorse; Box—this will thrive under the shade and drip of trees better than any other shrub; Alexandrian Laurel grows about two feet high, and bears a yellowish flower in June, succeeded by beautiful red berries. We would also advise *Amateur Gardener* to plant clumps of Chrysanthemums at intervals between the shrubs, as they will make a handsome show at the latter end of the year. *Rhododendrons* might do well, but the hardiest sorts only should be selected; we cannot speak with certainty, not knowing the aspect of the garden.—ED. F. W.]

PORCH TO COVER.—*B. C. F.*—Sempervirens roses are very beautiful for this purpose; they grow fast and are abundant bloomers. Put one to each pillar. They will require plenty of water, and the ground should be well manured at planting. *Hedera regneriana* would also be suitable, and would run up quick, and its large leaves would be rich and shady. *Clematis cœrulea* would also go to the top of the pillars at a rapid pace, but perhaps the quickest, safest, and cheapest covering would be Virginian creeper.

LILIUM LANCIFOLIUM.—*G. F.*—*Lilium lancifolium* is quite hardy in the south of England, and will do well in the same compost as used for bulbs generally.

SOIL FOR RHODODENDRONS.—*H. G.*—Turfy peat is the best. There are some silky loams in which they grow well, and a mixture of thoroughly decayed leaves, rotten wood, and sharp sand will do where peat is not to be obtained. Animal manures are not needed as a rule, and if the peat is good, the addition of dung is more likely to spoil it than to improve it; but old American beds may be refreshed with top-dressings of quite rotten cow-dung. Chalk lime and clay are materials they dislike. They may be planted at any time even when in full flower, but the best seasons are September and October, and February and March. We advise you not to proceed with your bed for another month.

PLANTS IN POTS.—*C. Y., Sussex.*—For the proper cultivation of plants in pots it is necessary to have such soils for them as are suitable to their growth. The soil that would be suitable for a fuchsia or a cockscomb would not suit an epacris or a heath; therefore to grow plants with any degree of success, a collection of such soils as are necessary should always be kept ready for use. Good sandy loam is required more or less for nearly all plants in pots. This should be selected from a common or meadow; about four inches of the surface soil will be found best. Next in importance is peat, for such plants as heaths and epacris. This variety of soil has generally to be purchased. These two sorts of soil, with the addition of sand, leaf-mould, vegetable mould, and rotten manure, in smaller quantities, are sufficient for the growth of nearly all plants. Leaf-mould is a valuable adjunct in plant growing.

ROSE-BUDS NOT EXPANDING.—*S. H. C.*—Your roses evidently last year were not sufficiently nourished. Give a good top-dressing of half-rotten manure, the rain will carry the juices down, and the plants will probably make more vigorous growth.

OLD ASPARAGUS BEDS.—*Amateur.*—We do not think it will pay to transplant asparagus at eight years' old. We should advise you to make the new beds of young plants and destroy the old ones.



WINDOW GARDEN—EXTERIOR.



RANUNCULUS DENSIFLORUS.

FUMARIA DENSIFLORA.



THE dense-flowered Fumitory (*Fumaria densiflora*) belongs to a small genus of Alpine annuals, some of them being indigenous to Great Britain. In former times, one of them (*Fumaria officinalis*) was used in medical practice, being considered a valuable antiscorbutic. Either the leaves were dried and made into an infusion, or the juice of the fresh leaves was administered; but it is now almost entirely out of repute. The leaves are somewhat succulent, almost without odour, and have a bitterish saline taste. The name of the plant is derived from the smell of smoke (*fumus*) which it emits.

The subject of our article was discovered at Montpellier, and the plant has since been introduced into this country. It may be propagated from seed, and can be grown out-of-doors in ordinary garden soil, preferring, however, that which is of rather a light character. It usually reaches the height of about twelve inches, and may be expected to be in bloom from May to August.

 WINDOW GARDENING.

BY JOHN B. MOLLISON.

(Continued from page 9.)

WINDOW-BOXES.

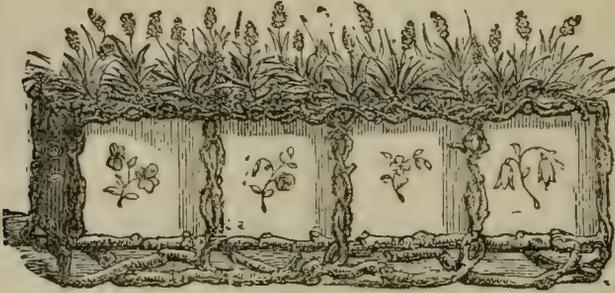


I SHALL now consider the construction and arrangement of the window-box, which of itself has become quite an institution in the land. It is in reality the real window-garden, beautifying our windows with its miniature flower border, in which, by judicious management, the revolving seasons of the year can be marked by a selection of their choicest flowers. Spring comes in with its hyacinths, tulips, crocuses, snowdrops, wallflowers, arabis, daisies, pansies, and other welcome beauties; summer with its geraniums, fuchsias, calceolarias, lobelias, pansies, and a host of favourites; while autumn brings the addition of stocks, asters, chrysanthemums, and others; and winter even, with its frost and snow and dull flowerless months, completes the circle with a few branches of variegated shrubs and holly-berries tastefully arranged, giving the window a bright appearance for the season. All this is easily done, and within the reach of most people. A few shillings laid out on this innocent pleasure is money well spent indeed, returning tenfold interest for the outlay in the pleasure you enjoy through your lovely flowers, and the cheerful appearance they give to your dwelling.

How delightful and interesting to the eye is a well-filled window-box! What a cheerful aspect it gives to a street or square in a city or town where every other window is gay with miniature flower-

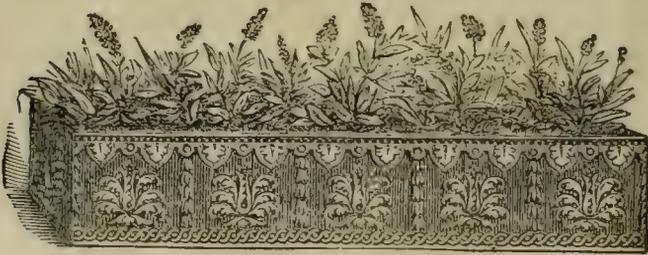
gardens. Many are the loving looks cast upon them by the passers-by, who admire them at a distance, envious of the favoured ones who have the delightful pleasure of attending to them.

It is a treat at almost any time of the year to pass along some of the streets and squares of London, where window gardening is carried on to some extent. There it is evident window gardening



has become an institution, for it is quite a common thing to see the façades, windows, balconies, and areas of the houses gay with the richest verdure and glowing with all the colours of the rainbow, causing one to wonder that people who see it do not go and do likewise, as far as their circumstances will permit; and I am sure window gardening in our towns and cities could be carried on to a far greater extent than it is at present. I hold that every person who has a flower in his window confers a benefit on the town at large, for it helps to brighten up the dulness of the street, and imparts an air of cheerfulness and content to his own dwelling.

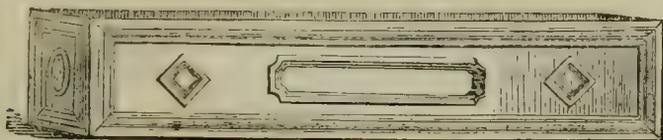
Window-boxes are made and sold in various styles of workmanship and material, and any respectable seedsman will supply you.



Enamelled tile boxes range from six shillings and sixpence per running foot and upwards; they are expensive to buy. You could make nice ones of wood yourself, or you might get a carpenter friend to make one for you. Virgin cork is an excellent material for the rustic style of boxes, which you can purchase at fourpence per pound. On this page illustrations are given of the best styles of ornamental flower-boxes now used for window and balcony gardening, which are made by Messrs. Barr & Sugden, of King Street, Covent Garden, London.

I will now describe to you how to make a wooden one at very little cost and with little trouble, which will answer the purpose as well as the best made. It should be about eight inches wide by ten

inches deep, inside measurement, to allow two inches at the bottom for drainage and one inch on the surface for watering. This prevents the soil from being washed over the sides of the box and dirtying the paint or tile, which looks bad. There will be seven inches left for soil for the roots to spread about in; quite a sufficient depth, if good rich soil is used, such as will be recommended in another chapter for pot plants. A pinch or two of guano or dissolved bones may be added and incorporated well with the soil. The length of your box should be according to the breadth of your window, leaving it easy,



so as to be handily taken inside at any time. The sides should be of three-quarter inch deal, and as it is best to nail the ends between the sides, the ends should be of one inch deal, and the bottom of the same thickness. Wood of those thicknesses makes an excellent box. Larch is the best kind of pine for the purpose, but a box made of oak lasts very much longer than one made from any other kind of wood.

I will not limit the size of the box, as circumstances must decide that point, but for any ordinary window the one I have described will answer best.

The outside of the box should now have three coats of paint. Green is the best colour, being Nature's own choosing, and it accords best with the flowers when growing in it. You can have it nicely done in imitation stone-work by painting it of a stone colour, and while the paint is wet dusting it over with silver-sand. Taste must guide you in the decoration afterwards; all lines, however, must be drawn quite straight, and the parts of designs well balanced, so that there be nothing ill drawn to mar the beauty of the flowers, for a neat, clean, well-painted box adds greatly to the effect, and is always a credit to the person interested. Never paint the inside of a box, for plants do not like paint.

I have seen people make nice little wooden boxes much in the shape of a pot but square, which looked very neat and answered the purpose well. A little taste can be displayed in ornamenting them.

I must particularly tell you that the window-box should be raised up a little from the window-sill for the sake of drainage, and to keep the woodwork from spoiling in any way. The best plan is to have iron rests fastened firmly to the window-sill to stand the box on, with a catch at the ends to prevent the box from being toppled over at any time by accident. You must also see that the box has proper means for drainage; five or six holes should be bored through the bottom.

If you have not an auger to bore holes with, the kitchen poker heated red-hot will answer admirably. The holes should be about an inch in diameter. If the bottom of the box were made in two

pieces, and an open slit one quarter of an inch wide left between them, it would answer the purpose well. A window-box made of lead or sheet-iron, though more expensive at first, will outlast a dozen wooden ones. I once saw an excellent contrivance for window plants in pots, or to have them planted out. The contriver was a tailor by trade, and a man extremely fond of flowers. Outside the window where he sat at his work he had contrived to arrange quite a little flower garden of a most interesting description. He had two iron brackets fixed below the window, and a zinc box placed on them full a yard wide, the sides being nearly a foot high; this he filled with good soil, after providing ample drainage, and there all the season through he kept up quite a grand display of flowers. I often admired his window-box, and the good taste he displayed in arranging it. In the spring it was quite a treat to see his box when his bulbs were in bloom. He was a happy little man, and a true lover of flowers. I often think of him with his little garden, and reflect how much people could do in that way if they would only try, or could have seen the splendid example of my tailor friend.

THE WINDOW GREENHOUSE.

The Miniature Window Greenhouse, which I will now consider, is scarcely fitted for the centre of large towns, but answers well in suburban districts and country towns. The window greenhouse is a thing of far greater pretensions than the window box. It is an ambitious step towards its great progenitor, the conservatory, and an object which all lovers of flowers, who take a pride in their window boxes, must long to possess. And why should they not possess it? It is but the question of a few shillings, if they have the ingenuity to make one themselves, or can get a carpenter friend to construct it for them.

The window greenhouse is the climax of window-gardening, the *beau idéal* of window-gardeners, enabling them to grow a greater variety of plants, and to get up good specimens for exhibition. But apart from that, it is a great ornament to a room. What a world of interest is centred around it. Visitors are loud in their admiration of it; everybody compliments you on your happy invention and the beauty of your flowers. To children it is a treat of surpassing interest. They carry away remembrances of it which they never will forget.

But the great event of the season, "The Flower Show," is drawing near. You have been looking forward to it for months past. You have been dreaming of this or that plant as being the future prize-winner. Now you water and tend them with redoubled interest. Day by day you have marked the progress they have made towards the state of perfection you wish them to reach. At last you have reared them into fair exhibition specimens, and, on the morning of the great day you stage them on the exhibition table amongst your neighbours' plants, with nervous feelings of anxiety. But luck is on your side; the prize tickets decorate your favourites, and they stand proudly amongst the others, reflecting credit on your skill as a

plantsman, and making your heart bound with pleasure when you see them taking the place you had long hoped they would. You feel an honest pride in pointing out to your friends and acquaintances the prize-winners of the day. Ah! then you think there is nothing so interesting as your little greenhouse; and you work at it again with renewed interest, determined to keep up the name you have won, dreaming dreams of future success in the prize-list, if all goes well till the next flower show.

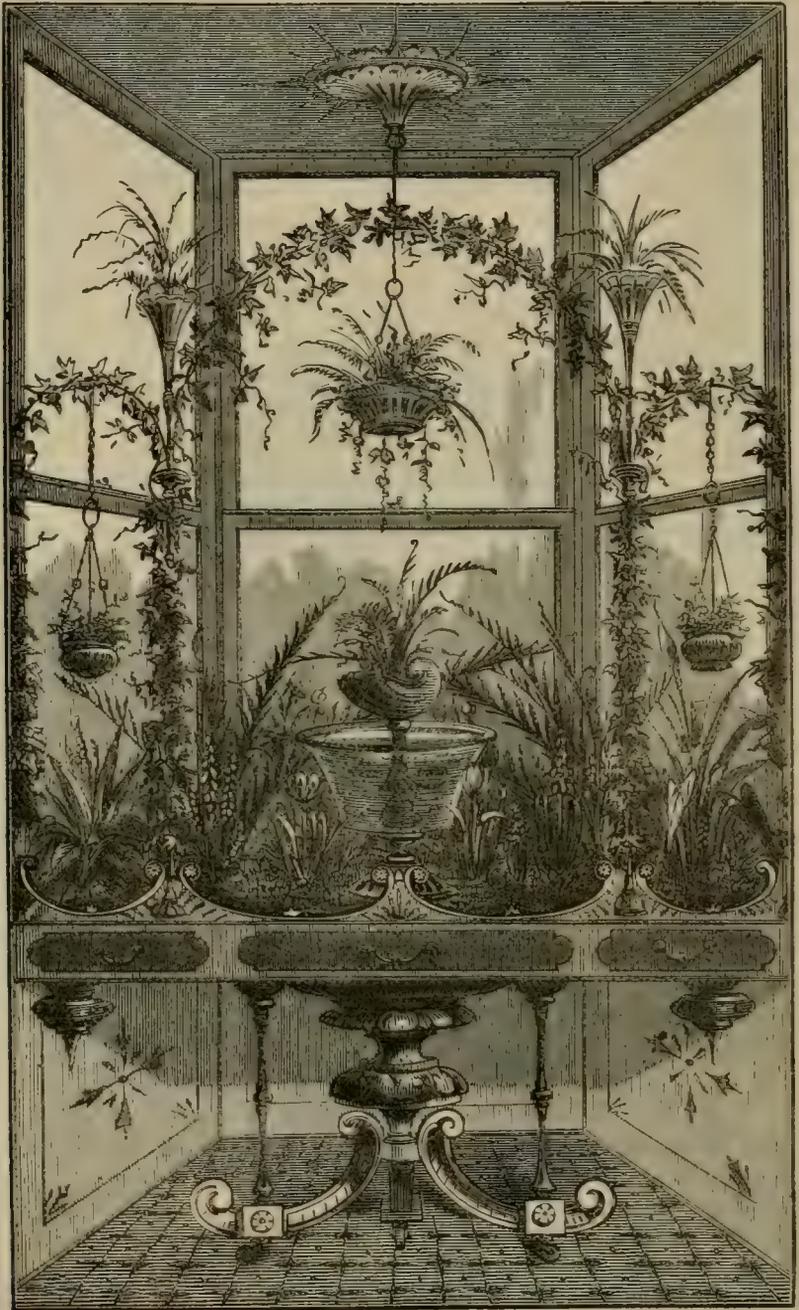
The fact is, every one in a country town or suburban district, with a love for flowers, should get a miniature window greenhouse.



If you once have one, and be able to grow your plants well, it will become a necessity of your life, and you will be surprised at the interest you take in every plant within it.

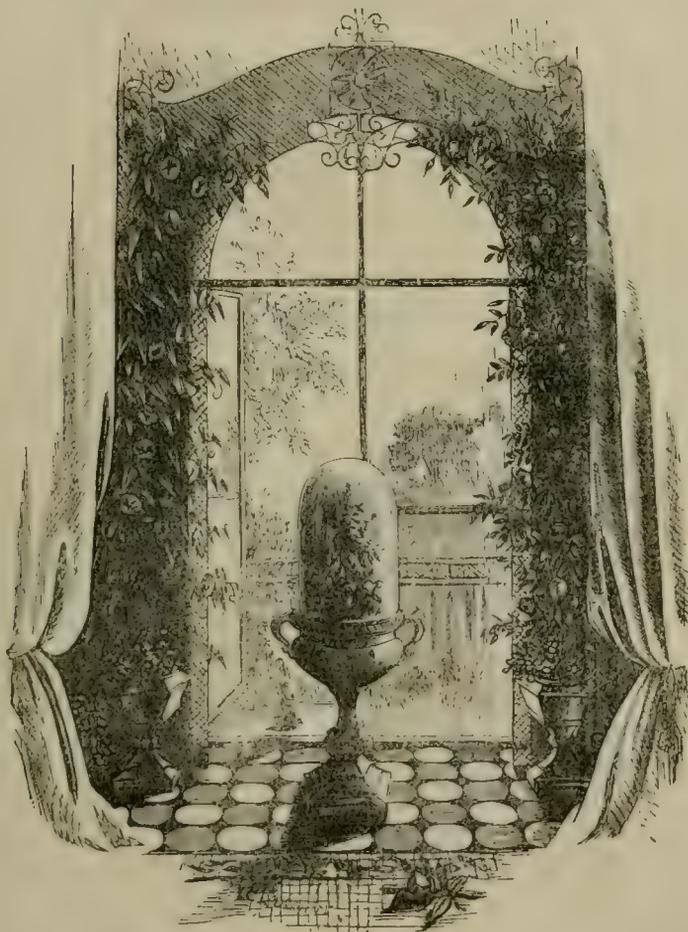
I will now try to direct you as simply as I can how to construct one for yourself. You must first get a blacksmith to fix you up a pair of iron brackets below your window. They should project out two feet at least; you must get them securely fixed, as the greater part of the weight of your little greenhouse will lie on them. Then you must fix a narrow three-quarter-inch board up each side of the window, with a cross board above to tighten it, and have all close

fitted and fixed with a few nails to the crevices of the stones. This frame is to secure the greenhouse and to prevent it from interfering with the window's movements—the ventilation of the greenhouse



being independent of the window. For any ordinary window the greenhouse may be of the following dimensions:—Three feet high, two and a half feet wide, and two feet front elevation, the length

being according to the breadth of the window ; at least six inches all round should be of wood to give small cuttings or seedpots some protection from the sun. There should be at least two astragals down the roof, front, and sides, as it is not so costly if a small pane is broken as if it were a big one. It should be glazed with 21 oz. glass, that is 21 oz. to the lb., and have three coats of paint. White or light stone colour is best. The six-inch board all round may be painted green or in imitation of brickwork, according to your taste.



The bottom should be of good strong deal or sheet iron, with several holes bored through it to drain off the surplus water, and an inch of fine gravel should always cover it, as the plants will be greatly benefited by the bottom of the pots standing on a moist surface. The bottom should be screwed to the iron brackets and the sides fitted in and screwed to the upright bars at the sides, leaving the window free, so that its opening or shutting may not be interfered with. The board at the front should be hung on hinges, so that it may be pushed open a little on warm summer days for ventilation. And a ventilating board six inches wide should be fixed on hinges

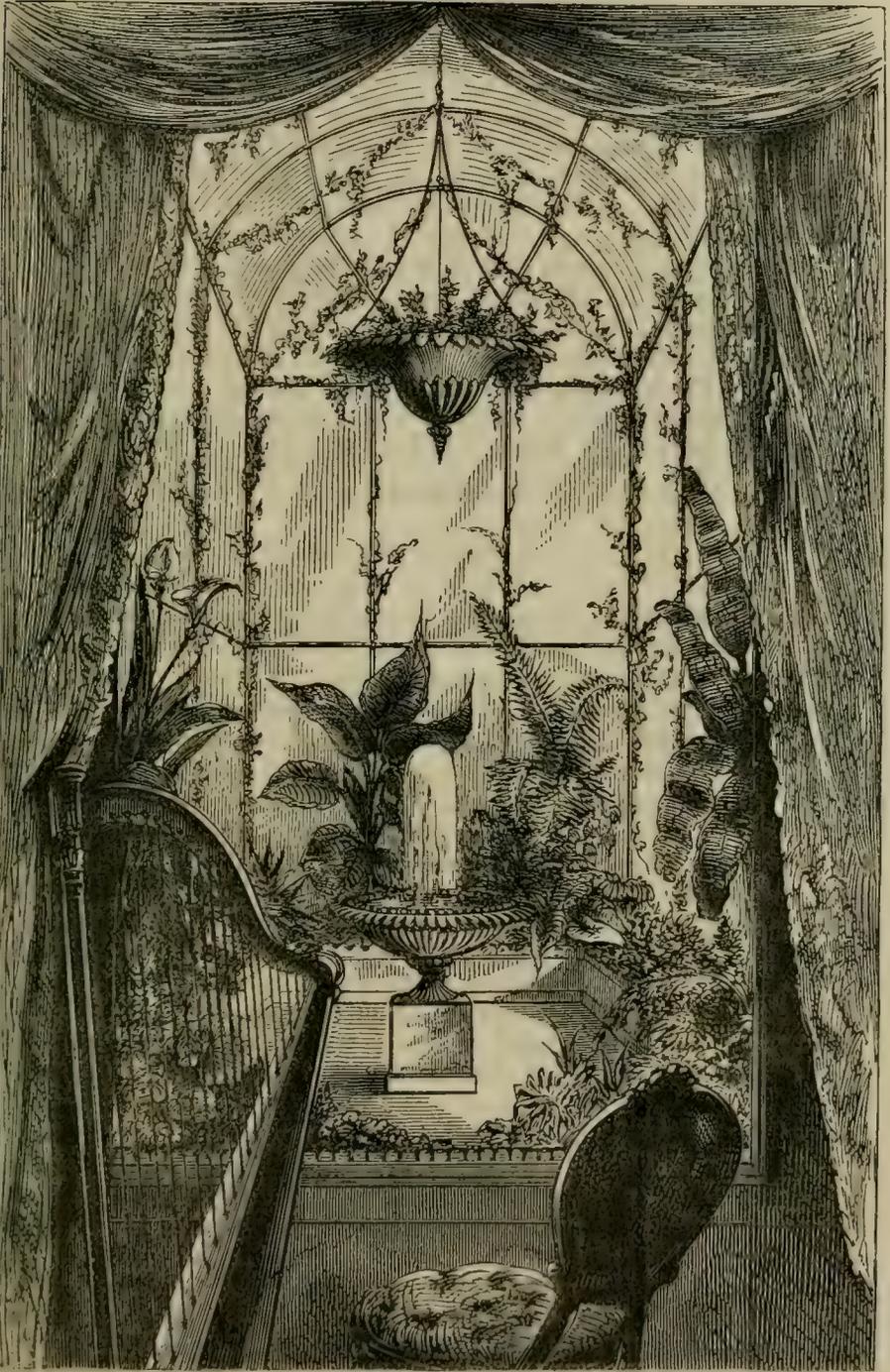
at the top next the window, so that it may be easily opened at any time. This ventilating sash may be of wood, but it will be far neater if it be a glass frame, and would not intercept the view in any way. A neat little roller and blind should be fixed immediately under the ventilating sash at the top, to shade the plants when the sun is strong. It must be made to come down close under the roof; a tight cord down each side will work it well if a little pulley be fixed to the front, and a cord run over it from the centre of the blind. You will soon see the benefit this will be to your plants. It keeps the hot sun from scorching them up and drying their tender roots



by heating the pot, which would soon tell on their health. Shade from the sun when it is hot gives your plants a green healthy appearance and keeps them longer in bloom.

The miniature greenhouse I have attempted to describe to you, is a very good size for an ordinary window; though it may reach high it cannot darken your room. Besides, the plants will form a natural blind far superior to anything else, and will always be a pleasure whenever the eye turns on them, while the fragrance and beauty of the flowers may at all times be enjoyed, though the inmate of the room be an invalid, who, more than any one will appreciate and enjoy a window greenhouse. To such a one the

sweet smell and sight of flowers would be an immense benefit, sometimes doing more real good than all the doctor's drugs.



Window greenhouses, fern cases, and aquariums, in a great variety of styles, are sold by the principal seedsmen in London and
February.

large towns. They all range from five pounds and upwards, and are excellent in their way; but their price puts them out of the reach of most people. You can easily construct your own by following the directions I have given, and I would strongly advise all who can to try. You will find it a real pleasure if once in working order. On pp. 37 and 40 are illustrations of plant cases for the outside of windows, very often met with in London and other towns. They are extremely elegant contrivances, and are very pretty when filled with ferns and other plants. But the very height of refinement and elegance in window gardening is represented on pp. 38, 39, and 41. Bow or French windows are especially adapted for carrying out this arrangement; and, where cost is a secondary consideration, a very picture of beauty and elegance can be carried out, to the beautifying of your home, the credit of yourself, and the admiration and delight of all your friends and acquaintances. It can also be carried out on a smaller scale in any window having a recess; and I am sure many little contrivances in this way will suggest themselves to your mind if you once apply yourself to the subject.

(To be continued.)

ON THE CULTURE OF THE FUCHSIA.



THE season is now at hand when all desirous of producing fine specimens of this beautiful plant should at once commence selecting from their stock some of the finest, most healthy and vigorous plants, for the purpose of starting into growth. Commence by shaking them clean out of the old soil, prune the roots by shortening them back, also prune the tops by cutting back the shoots to the distance of two or three joints from the stem. Of whatever shape you wish to grow these plants, now is the time to decide; if of a pyramidal form, prune back all the side-shoots, leaving only short spurs from the stems, and allow the leading stem to go as far as there are side-shoots or spurs to furnish it;—for a dwarf bushy plant, prune the side-shoots back to the same distance as the above, but shorten all the leading shoots, and reduce it into a compact and neat form. Prepare some good turfy loam, with the same quantity of fibrous peat, half the quantity of well-decayed leaf-mould, some rubbly charcoal, and sharp sand; mix these well together, taking special care to well drain your pots before potting. I have always found a few large potsherds at the bottom of the pot, and upon the top of these some coarse charcoal, suit the fuchsia admirably. I know of no plant that delights in charcoal more than the fuchsia, always observing, upon shifting the plants into larger size pots, their roots adhering to it, and presenting the most healthy appearance.

When performing the potting of them, bear in mind not to use the pots too large at first, always allowing room for two, or, in some cases, three shiftings. When potted, place your plants in a moderate

heat, where your thermometer is ranging from fifty to fifty-five degrees.

Care must be taken in watering them, not to supply it too bountifully at their roots until they are in a more forward state of growth; but on clear bright sunny days, syringe frequently over their heads with water of the same temperature as the atmosphere of the house they are growing in. This will soften the bark, and cause them to bring forth the young shoots with more vigour.

As soon as the young shoots have obtained the length of three joints, pinch out the tops; this will cause them to break back, and be the means of furnishing your plant with foliage well down to the pot. When they have again broken, if all goes well, they will require a careful examination of their roots, and repotting into larger pots, using the same compost as before (not forgetting the charcoal drainage). When done, place them again into moderate heat, where they should remain until they have filled the pots with roots. When this is ascertained to be the case, remove them into a cooler house, or lower the temperature gradually of the present one, when they will shortly begin to show their bloom. If early-blooming plants are required, allow the bloom to remain; if not, pinch out the tops again, and this will cause them to throw out another course of vigorous shoots; and when these are grown an inch long, the plants may be shifted once more, as final. But, should very large plants be the principal object of the grower, they can be shifted again as they advance in growth, and at this season may be supplied with some stimulant in the shape of manure-water about twice a week; be cautious not to give it to them over-strong; rather supply it more frequently, and at a moderate strength, as it often injures their roots, and reduces them to a delicate and unhealthy state, when disappointment and often a total failure is the result. The most direct and safest plan to procure a supply of liquid manure is—to brew your own, by adding half a bushel of cow-dung to eight gallons of soft water, allowing it to stand twenty-four hours before using.

If the cow-dung should be fresh, the liquid will require diluting with an equal quantity of clean water; but if decomposed, it will not require reducing in strength, and may be used as made by straining it through coarse canvas or other material, for, without some such precaution, it will be found to close the pores of the soil, and the plants will become stagnant and unhealthy; but when judiciously applied, it amazingly improves the growth and assists the plants in throwing out and retaining their blossoms and foliage both strong and robust. It is at this period the charcoal discharges its important duties: being of a porous quality, it absorbs the manure-water when given, and holding it, supplies the plants as their nature may require.

B. Y.

FORCING SEA-KALE.



HE sea-kale is a native of Britain; found in abundance on the sea-coast, growing on rocks and stony places, in the vicinity of Brighton, Worthing, Eastbourne, and other places. It is a very useful vegetable, and highly esteemed in most families. By attention to its cultivation, and good management in forcing, it may be kept in succession for a long time, and that, too, when most vegetables are scarce. Having had considerable success in growing this plant, I am inclined to lay before you my practical mode of culture. Sea-kale is propagated in various ways; from seeds sown in the open ground, from pieces of the root cut in lengths, and from plants two or three years old. Some prefer the latter system, but whichever mode is adopted, the ground must be well prepared by trenching, with the addition of plenty of good fresh manure in the autumn, laying it up in ridges during winter, that the frost may act on it. In the spring it will require to be forked and carefully turned over, to get it in good order. The time I prefer for sowing is the last week in March, or the first week in April. I find that, if sown before that time, it is liable to go to seed, which spoils the crown for the season; and, on the other hand, if sown later, it will not be sufficiently strong for forcing in the following autumn. I sow in rows, about one foot apart; when the plants are up, I thin them out to six or nine inches distant, keeping the ground between them well hoed and stirred, which I find of great utility. I propagate from pieces of the root, cutting them into lengths of about four inches, pricking them into rows two feet apart, and one foot in the row. This is done in the month of March; they soon root, and become callous at the top, when several crowns will appear; but great care must be taken to have the crowns all plucked off with the exception of one, which must be left to grow during the summer. If this precaution is neglected, the plants will, in a great measure, be useless; for when there are several crowns crowded together on one plant, the nourishment will be divided: consequently they will be small and weak; but if one only is left, it will receive all the nourishment derived from the root, and will, if attended with frequent hoeings, be large and fit for forcing the next season. To form a new bed of sea-kale, in order to force in the open ground, I prefer one-year-old plants, as small as I can procure them. I plant them on a raised bed, at least two feet high and five feet wide, putting two rows on each bed, and the plants three together, in triangles, two feet apart. To force them, I place a large kale pot over each three crowns, and then cover the whole surface of the bed with leaves to the thickness of two feet, which makes the alleys four feet deep. The leaves impart a genial heat through the bed to the roots. However, I prefer forcing sea-kale in the following manner: To cut off the crowns about four inches below the surface of the soil, and place them thickly in seed-pans with soil; then put them under the stage of a store with a large pot over the pan, covering the pot with leaves and dung, and keeping them as close as possible. In this manner

the plant will come as strong, tender, and well blanched, as if grown in the usual manner out-of-doors, and with one quarter the labour. In the following spring the roots are cut over, for the crowns break up very strong; and much attention in thinning them is necessary, for if more than two or three heads are left to each, they will crowd and spoil each other; whereas, if this is attended to, and the surface kept hoed deep, with the application of manure-water during their growing season, a supply of good strong crowns will be produced for next year's forcing. This is the system I practise, and consider myself amply repaid in the result for the little extra trouble I have taken.

H. S.

CULTIVATION OF THE DAHLIA.



THE month of February may be considered as the commencement of the dahlia-growers' operations; the roots are then drawn from their resting-place, and after being carefully examined, all traces of rottenness removed, and the labels made right, they are either potted and plunged into a gentle hot-bed, or placed in the heat without any other preparation. As soon as the new shoots have grown from two to three inches in length, they are taken off with a sharp knife, the heel or base of the cutting pared square, and then placed by itself, with its name, into a small pot filled with sand, leaf-mould, and loam. Each cutting as it is potted should receive a gentle watering, and be immediately returned to the hot-bed, taking special care to shade them from the sun until they are rooted. Sometimes, with scarce sorts, the young plants have their tops taken off, and every bit of a shoot which rises from the old tubers is also struck, a practice that nothing but the natural desire to "make the most of a good thing" can excuse, as it entails weak, unhealthy plants, which cannot possibly produce fine flowers. The amateur who grows only for the sake of really handsome blooms, should not allow this desire to extend beyond just the strongest shoots, or disappointment will inevitably ensue; and these, when struck, should be encouraged to grow by frequent shifting, and every other means, that when the season arrives for consigning them to the open garden, he may not only find healthy, but truly vigorous plants for the purpose. Between the periods mentioned, and over which this re-potting and stimulative regimen extends, the plants should be gradually inured to the action of the sun and air, that they may receive no check on the final remove; for nothing can be more unreasonable than to expect that, after being confined, as is too frequently the case, in a little pot for three months, and until its roots have been interwoven to a complete solid body, such plants should proceed with the rapidity and vigour of one to which attention has been given, and consequently has all its energies in an active, healthy state; so also it is equally wrong to defer the propagation until the last minute, and then as soon as a single root or perhaps

two, are emitted by the cutting, the poor little thing is at once exposed to the crippling effect of a cold wind, or the enervating influence of a scorching sun.

The end of May is the usual time for transplanting to the open ground, as in ordinary seasons all danger of frost has passed away, and unless the weather is particularly serene and genial, the plants should be protected by handlights or some other contrivance until they have become re-established. We have been thus minute over the first part of their culture, because we believe that very much depends on how they are then managed, not but that a great deal less trouble will suffice when merely grown for ornamenting the borders ; so that plants can be had at the desired time, being sufficient for that purpose ; but we are now writing of the treatment of such as are cultivated for exhibiting, or the production of the very finest flowers. We have indeed seen it printed that to take off cuttings, or incur the trouble of starting the roots at all, was quite needless ; that merely planting the tubers in the open ground in April was sufficient, or even to treat them as annuals, by sowing for the supply every season ; and perhaps this is enough in some places, but the results of such a system must only be viewed at a distance, as fine flowers cannot be expected.

When the plants have attained the height of a foot, stakes should be placed to them, that they may not receive injury from the wind ; and as they grow, attention should be given to the removal of all superfluous shoots that may spring from the bottom, and it is also desirable to thin the flowering branches near the top of the stem before they become large, tying out those which are allowed to remain, that light and air may be admitted to the interior of the plants ; this will occupy the greater part of the summer, and in August the first flowers may be expected, from which time unceasing attention will be required to the thinning of the blossom buds, tying and loosening of ties, watering, trapping of insects, and shading the flowers. The first-mentioned operation should be performed when and wherever a more promising bud than usual makes its appearance, allowing the whole energy of the branch from which it springs to be devoted to its sole use, as any rivalry between two or more flowers is sure to terminate in disadvantage to the whole of them ; indeed, it is sometimes found desirable to reduce the number over the entire plant, in order to give strength and size to the remaining flowers. Watering is an important aid at this period, and must not be neglected ; to save a considerable amount of trouble it is advisable to cover the ground, for the space of a couple of feet round each plant, with half-rotten dung, or other mulch ; this keeps the earth from drying rapidly, and, by being watered over, causes a genial damp atmosphere near them, besides the advantage gained from the particles of manure which wash downwards to the roots ; once a week diluted liquid manure should be applied, and in this and all other waterings it is better to give a thorough soaking, even at some distance of time between, than to apply small quantities ever so frequently.

The depredation of insects is a constant source of annoyance

from the opening of the first blooms till the close of the season, and unless their destruction is unceasingly persevered in, the cultivator's expectations cannot be realized; earwigs, those insidious lurking foes, are most common, and much to be dreaded. The trap generally used for the destruction of these insects is a small flower-pot filled with hay, and inverted on the top of the stake that supports the plant. The pot should be daily examined, and the contents destroyed. The small insect, commonly known as the "thrip," is also very destructive, attacking the leaves and buds, and by puncturing destroying their vitality; the best measure both of prevention and remedy in this case, is to frequently syringe the whole of the plant, throwing the water with sufficient force to dislodge any that may be on them. Should it happen that the thrip have effected a strong hold of the plants before they are discovered, the foliage and stems should be dusted over with sulphur in the middle of a hot day; the fumes arising from this are fatal to the insects; and to extirpate the few that remain, employ the syringe heartily, which will at the same time remove them and the sulphur together. To enumerate the various methods of shading would occupy so much space that we are compelled to speak only of those commonly employed; the cultivator's taste and means will generally regulate these matters better than can be done by the most detailed description. It must be understood, however, that it is only the blooms which are to be covered, as to shade the leaves would be to destroy the energies of the plant.

On the approach of frosty weather the layer of mulch round the stems should be increased in thickness and extent to effectually preserve the roots, and when the foliage becomes injured past the hope of endurance, they should be cut down, leaving the tubers in the ground a week longer to ripen; when they are taken up, remove the soil, and set them in the sun till perfectly dry, after which any cool place where they can be secured from frost, moisture, and light, will be suited to their preservation through the winter.

R. W. P.

CULTURE OF THE ANEMONE.



T would be difficult to enumerate the variations in colour this gay spring flower assumes; so sportive is its nature in this respect, that there is a diversity of the mixing of the white with the various shades of scarlet, carmine, rose, red, violet, blue, slate, etc., in each individual flower raised from seed, by which is produced the double, semi-double, and single varieties, and few there are among them but claim our admiration. The anemone has not of late years been so much cultivated by the amateur florist as formerly, for what reason we are at a loss to discover, for it is not difficult of cultivation, growing freely in ordinary garden mould, when of a scanty quality and in tolerable good heart, although it is customary to prepare

February.

compost expressly for this purpose, and where it is convenient the following will be found excellent:—Fresh earth from a common, or some other pasture land, that is of a light or sandy quality, whether of a yellow, hazel, or dark colour, is not important; it should not be taken deeper than four or six inches, with the turf included; such soil will be sweet and fit for immediate use. First having beaten out the earth from the turf, and clearing it of obnoxious insects, add to it about one-third of decomposed cow-manure, to be well incorporated with the above; before using, rake out large stones, but do not screen the compost, it is much better without. About the beginning of September is the proper time to prepare the beds for planting; if the soil be wet, the beds should be raised about six inches above the paths or surface of the ground, laying at the bottom some of the coarse rakings from your heap, by way of drainage; but if your soil be a dry one, three inches will be sufficient.

The compost intended to plant the roots in should be about one foot thick, therefore you must remove some of the garden earth to make room for it. The beds should be made up at least two or three weeks prior to planting, in order that the soil may settle; before you commence, stir the surface of the bed to about three or four inches deep, then raking it to a level surface, divide it into four-inch squares by drawing lines each way, and plant the roots in the centre of the squares, which will keep them in line in an uniform distance. Some use a small trowel for this purpose, while others make use of their fingers; it matters little which, so that the bulbs are planted about two inches and a half deep, with the eyes upwards; this being accomplished, with the back of a rake draw the earth over the crowns of the roots, so as to cover them about two inches thick. The best season of planting, for an early bloom, is about the middle of September, and for a middle bloom, in October; others, for still later flowering, may be planted in December, or the beginning of the year, and, though late, in most seasons flower exceedingly well, but do not produce such fine increase. J. W.

GENERAL MANAGEMENT OF THE GRAPE VINE.

BY R. W. P.



WE will begin by treating of the management of the grape vine in the open air, and will presume that care has been taken in selecting the most suitable position on planting, for it is quite certain, that unless the roots of out-door grapes are in a very favourable position, there will exist but little probability in our variable climate of the fruit ever attaining to perfection, as regards flavour, even if it ripens at all. Let them, by all available means, be placed so that they may be fully acted upon by the sun, and if, in addition, the supply of moisture can be acted on, it will greatly facilitate their management.

Could we, under all circumstances, regulate this, much would be done to insure a crop of ripe grapes every season; thus by irrigation, the new developments might be encouraged in early summer, when they are often stationary, in consequence of dry weather; and, on the other hand, in autumn, had we the means to thoroughly drain the mould about the roots, it would go far to induce ripeness, which, under the influence of ordinary seasons, is deferred till so late, that injury from frosts is a matter of frequent occurrence, and in wet autumns the fruit is entirely spoiled, because of its inability to ripen. The strange anomalies that yet prevail in the science of horticulture, from a want of attention to principles, is perhaps nowhere so evident or frequently met with as in the management of the vine. We plant them against a wall to induce previous maturity, which at the same time we prevent by placing the roots in a soil as unctuous as the bed of a river, and crowd the branches so thickly together, that the wood and its fruit are as completely shaded from the influence of the sun, by the over-luxuriant foliage consequent on the position of the roots, as though the whole were enveloped in a blanket, and yet marvel that our grapes so seldom ripen.

The "long rod" method of training is to be preferred for vines in the open air because of the less amount of shade; and that the wall may be properly covered, the horizontal branches should be trained along at about a foot from the ground, and the rods upwards from them, at not less than two feet from each other. By the beginning of March all pruning should be completed, and the plants nailed up; after which no further attention will be required until Midsummer, by which time the bunches will have set, and the berries require thinning; this should be done with a pair of pointed scissors, leaving the remainder loose upon the bunch, so as to have room for each individual to swell to a full size, and at the same time the branches which bear them should be shortened to the joint beyond the fruit, and any after-shoots that may appear from these laterals must be taken away as they come, that the bottom growth may be encouraged to occupy the wall for the next year. In nailing the young shoots of a vine, care should be taken to leave the shred loose round the branch, because the latter will swell very much, and if at all obstructed in its upward progress, become crooked or perhaps break. Towards the end of summer, if very dry weather occur, the plants are liable to attacks from red spider, and if this happens before the fruit is fully grown, measures must be taken to reduce their numbers; clear water thrown with force from a garden-engine is perhaps the best remedy, and if frequently repeated, will certainly dislodge them, or the leaves may be dusted over with sulphur. When the fruit is just ripe it should be covered with gauze bags to exclude insects, and on the approach of winter the branches should be partially unnailed, that the air may get at the back of the branches, to ripen the part previously confined to the wall. The pruning may then be done, and the wall washed with a mixture of lime, sulphur, and soot, if it is supposed there are many insects in the crevices.

In the greenhouse grapes can never be more than a secondary consideration where the regular occupants of the house are at all cared for, their management differing so greatly from that proper for the majority of greenhouse plants. Yet, with some judgment in alternating the treatment, and a little allowance for trifling inferiority in both, a medium crop may be obtained. As some part of the collection will remain in the house until June or even longer, the first stage of the vine's progress will be slow, and the ripening of the fruit consequently deferred till rather late in the season, unless an endeavour is made, through July and August, to get them forward as rapidly as possible. The vines, in the earlier stages of their growth, require an elevated and very damp atmosphere, which is decidedly inimical to the health of the general collection of plants; the latter must therefore be removed to the open air, or some other place, as soon as the weather will permit, and if some slight protection can be afforded them, the removal can take place at the beginning of May. The house should then be kept close, comparatively, in order to raise the temperature to about 70° through the day. Freely syringing the foliage every night and morning, and the liberal use of water on the paths and floor, will maintain the requisite amount of moisture in the atmosphere necessary to their full and early development. As the berries begin to colour, the atmosphere should be rendered as dry as it was moist before, that the fruit may possess a full deep colour and rich flavour; but unless this can be effected in the early part of the autumn, by pursuing the course pointed out, it will be quite impossible afterwards, as the plants will require to return to their stations, and then the necessary waterings will create so much damp in the house as, in all probability, will lead to shanking and rotteness, especially if the weather prove at all cloudy. The summer must therefore be devoted to the vines, and after the crop is gathered, they may be taken out of the house, so as not to interfere with the winter management of the plants.

When grapes are grown in the regular vinery, of course they are the permanent object, and nothing antagonistic to their welfare can be permitted, though it not unfrequently happens that false economy induces the introduction of other subjects as difficult to reconcile as even New Holland plants. In such cases perfection never is or can be arrived at. The period of starting the vines, as it is called, or commencing the seasonal action, depends entirely on the time the fruit is destined to be ripe. The earliest crops are started in November; these are usually ripe in April and May. But the most usual time is January; and for real excellence, perhaps, this is the best that can be selected, because the vines then progress in unison with the season, or rather they have the advancing season to aid them. When it is determined to commence exciting the plants, they should be pruned and cleaned, by removing the loose bark from the stems and branches, and if insects are suspected of harbouring on them, the whole should be coated with a mixture of lime and sulphur, or soft-soap and sulphur, made into the consistence of thick paste, and applied with a brush, taking care to rub it into every crevice. This will prove fatal to the mealy bug, scale, red

spider, and all other hybernatory insects that usually infest the grape. When thus dressed, let them be tied to the rafters loosely, and close the house. No fire-heat will be required for the first fortnight, and the increase of temperature must subsequently be brought on in a very gradual manner; 45° may be taken as quite sufficient for the mean temperature of the first month, or till positive signs of action are observable in the buds, when it may rise 5° more, continuing at that till the first leaves are fairly visible, when again 5° more may be added, and the application of moisture commence. This is best provided in the early stages of growth, by means of evaporating pans on the heating apparatus; but as the leaves are unfolded more will be required, and the syringe may then be used with advantage. In the third month from starting the foliage will expand, and the flowers begin to open. This is perhaps the most important period. It is necessary to syringe freely over the leaves, that they may be kept in a healthy, vigorous condition; and as the sun will be gaining power, air must be admitted to keep the temperature of an even character; it may reach 70° before the lights are opened, and then a little opening at the top of the house will keep it steadily at that point; continuing thus till the flowers are just bursting, when rather less moisture should be employed till the fruit is set, which, if the plants are nicely managed, will occupy about four days or a week; and during this time if the weather is favourable, a rather free admission of air may be indulged in, which, by drying the atmosphere of the house, will help to ripen the pollen, and render its distribution more easy and certain. It is a good plan, as a further assistance to this desirable object, to give the stems a smart shake once or twice a day; and by some it is recommended to syringe the flowers all over, as a means of scattering the pollen, but this seems rather objectionable, as the water may remain on the flowers long enough to destroy its fecundating powers, while a dry air must be more conducive to its ripening and spreading. As soon as the berries are observed to be set, an abundant supply of moisture must again be given, that they may swell freely; and to assist them in this stage, the introduction of ammoniacal vapour is found very beneficial, and may be easily provided, by placing in the house a quantity of sweet fermenting stable dung, to be turned to account also in the provision of bottom-heat for other things grown in the same erection, as French beans, and a variety of similar matters. Tanner's bark is commonly used for this purpose, and though more cleanly and regular in its action, is not quite equal to the dung in its production of ammonia. Air must now be admitted in quantities proportionate to the state of the weather, and the more that can be given, provided that the internal temperature is not less than 65° or 70° , the better for the grapes, as much of the mischief known as "scalding," etc., arises from keeping the house too close. If the vines are progressing in a healthy manner, they will bear a free current of air on fine days with manifest improvement; but it must not be admitted in large quantities suddenly, or the chill produced is quite likely to carry off the entire crop. Thinning the berries and bunches is an important operation, occurring when the

fruit is about the size of peas. The number should be reduced in a regular, equalizing manner, till they hang so that each individual will have room to swell to its greatest size, but not more, or the bunches will have a meagre appearance. The latter will, perhaps, require reducing in proportion to the strength of the vine; for the cultivator may rest assured that it is better economy to thin an excessive crop down to a moderate one, and thus secure superior quality, with the reasonable expectation of its being repeated in the next year, than to take a heavy crop of small, ill-flavoured fruit, to the almost certain prejudice of those to come in succeeding seasons. In conducting this operation it is advisable to avoid handling the fruit; it can be held with a crooked piece of wire, while the berries are extracted with the scissors; for when rubbed with the fingers it is supposed a predisposition to "shanking" is incurred, when the berries rot or shrivel at the point of union with their footstalks, just before they are ripe—a disease but too well known in all its forms, but for which many opposite causes are adduced, without any satisfactory explanation being arrived at either. Our own notion refers it rather to sudden changes in the atmosphere, as either an excess of moisture, or the rapid lowering of the temperature, when the fruit is nearly or quite full-grown, is known to produce it. Some care is necessary at the time the berries are changing colour, to properly regulate the heat on this account, and as ripeness ensues, the principal attention should be addressed to keeping it rather below the average, by the admission of larger quantities of air, which, as before remarked, increase the flavour, and imparts a finer colour and bloom; the sashes may then be opened, so as to keep the temperature down to 60°, and even lower, when they are quite ripe, only closing to exclude damp.

RONDELETIA.



THESE truly handsome stove plants are named after Rondelet, a French botanist of the sixteenth century, and belong to the important natural order *Cinchonaceæ*, the genus chiefly occurring in America and the West Indies.

There are about fifteen species of *Rondeletia* known, but perhaps the best for a general collection and the grandest of the series, is the scarlet-flowered species, *R. speciosa*, the subject of our engraving.

Rondeletias require peat and sand to grow in, with a brisk moist heat while growing, and may be easily propagated from cuttings of half-ripe wood taken off close to the stem, and shortened to four joints each. The cuttings should be planted in pure silver sand, covered with bell-glasses and plunged in heat. The glasses should be taken off every morning, be wiped dry, and replaced, and in dull weather may be kept off a few hours at a time. As soon as the cuttings have rooted, pot them off in sandy peat and plunge them in a brisk heat till they have filled the pot with roots, then shift to a

size larger, using sandy peat with one-fourth part of loam added. The next shift will be into their blooming pots, when great care must be taken to afford plenty of drainage, but placing a layer of moss over the cracks to prevent the fine earth running down among them. Over-potting is most injurious, and it is only by a regular course of progressional potting, using at each stage pots only one size larger than the last, that a satisfactory bloom can be obtained. The best time to pot is immediately after they have done flowering,



RONDELETIA SPECIOSA.

but if needful they may be shifted six weeks before flowering, but never on any account later. When coming into bloom, they require plenty of water both overhead and at the roots, and the temperature should not be lower than 70° . During summer, the temperature may range from 65° to 90° ; during winter from 50° to 60° . They are usually trained on wire balloons, and if carefully done the blossoms may be displayed very effectually, but sufficient support may be given by means of stakes or wirework, of a height of eighteen inches, when the bunches may be arranged to fall over in a free and natural way.

February.

THE RANUNCULUS.



FOR the culture of the *Ranunculus* let the ground, whatever its texture, be well manured, and thoroughly dug and pulverized. The best time for planting is the last week in February; the surface should be entirely removed to the depth of about two inches, not more, and being raked level, the roots are placed on it, and the surface mould returned. Some recommend the month of October for planting; this we object to, except in the case of requiring an early bloom for flower-garden purposes, when it is best to plant only the hardy turban varieties; with the others there is considerable danger of their receiving injury from frost and excessive wet, and consequently, it is preferable to defer it to the season first mentioned. When the blooms are advancing, it is no unusual thing for the weather to set in dry; when this happens, the *ranunculuses* must have abundance of water given them, and if every other application be diluted liquid manure, it will give them additional vigour. A slight shade is necessary to preserve the flowers, and every available means should be resorted to at this time to keep the plants in vigour, as they are not only supporting the flowers, but the new roots are just arriving at perfection, and therefore should have every encouragement. A top-dressing of half-rotten leaves, or partially-decomposed manure will be beneficial, and the paths may be filled up with old tan; in short, every means likely to keep the earth moist should have attention. Very soon after the blooming season, the leaves will begin to decay, a sign that the roots are fit to be taken up; a great deal depends on this being done at exactly the right time, for if taken up before they are ripe, a loss of vigour is necessarily felt, and the same happens if they are allowed to stand even for a few days beyond the proper time. The fit state is easily known by the leaves parting from the roots with a slight pull; when this can be done, let them be at once removed, and after cleansing them from the soil, spread them thinly in a shaded place to dry, turning them frequently, and at last give them one or two hours' exposure to the sun to finish them completely, and make them fit for storing away for the winter.

THE USES OF THE GARDEN FRAME.



IN treating of the uses of the garden frame, we shall endeavour to show, first, the many advantages to be derived from its application to a hot-bed, being what is usually termed a *hot-frame*; and, secondly, its application as a *hybernatory* or *cold-frame*.

It is in the light of a *hot-frame* that this useful appliance is generally regarded by the amateur gardener; but few are aware of the many great results to be derived from a judicious management of

it even in this respect. We shall therefore show how the best use can be made of it, and how something more than "a few braces of cucumbers" can be turned out of this comparatively "small extent of glass."

Towards the middle of February procure of stable manure a sufficient quantity to form a bed requisite for a three-light frame such as we described in the January number: enough for this purpose will be from two to three good one-horse cartloads. That which is best for the purpose is such as has been rather more than a week from the stable; and if it can be procured from a place where the horses have been highly fed, it will be found much better for the purpose, being far more retentive of heat than that which is taken from horses that are poorly fed. When the dung has been obtained, it should be conveyed to the place where the bed is to be erected; and here we would remark that is of the greatest importance that this should be in some sheltered situation, with a good exposure to the south, and so protected on all sides, as to be secure from the influence of high winds.

The first operation is to have the dung purified, or, as gardeners generally term it, "sweetened." The object of this is to dispossess it of those rank and strong gases with which in its green state it is charged, and which would be so injurious to vegetable life. It is therefore necessary that it should be thoroughly and effectually fermented before it can be applied to the use of a hotbed. The way in which this is done is, to throw it all up together in a conical heap, and allow it to remain in this position for about a week, at the expiration of which it will steam considerably, and a rather strong heat will be generated; care, however, must be had that the heat at this stage of the work is not so great as to burn the material, which is readily discovered by observing if the interior becomes whitened and dry. When it has lain in this state for about a week, the whole mass must be forked over, and made up into a cone similar to that in which it was originally formed; but proper attention must be paid during this movement of the mass, to see that that part of it which formed the exterior shall on this occasion form the interior, and *vice versa*, and also that all lumps be well separated, and the whole thrown loosely up together; this is what is called the first turning. In this state it should remain for another week, during which period also the heat will have become more regular and steady, and the dung will have lost a considerable portion of its noxious gases. It will be necessary to give it a second turning similar to the first, taking care on this occasion likewise that the exterior be thrown inside, and the middle brought to the outside. During these turnings, it should be well watered to prevent burning, and also for the purpose of assisting in purifying the mass. This should be attended to every time it is turned over: and if so, it will tend very materially to prolong the duration of heat in the bed. Many persons consider two turnings sufficient; but we would advise a third or even a fourth, as the more the materials are properly fermented, the more satisfactory will the results be; and in all cases it should be turned and watered until the straw assumes a dark brown colour.

Before proceeding to erect the hotbed, measure off the area which is intended to be occupied; this should be thirteen feet long by seven feet wide. These dimensions are greater than are usually recommended, but as our object is to show "how to make the most of it," the reasons for exceeding the ordinary size will be explained hereafter. The ground on which the bed is to be erected should be perfectly dry, and so situated, or of such a nature, as that water cannot remain on it. If, however, the situation must necessarily be wet, the base should be elevated six or eight inches, by wheeling soil or rubbish to the part. The operation of erecting the bed is begun by driving down four stakes, one at each corner of the parallelogram, which we have indicated above; these should stand about three feet out of the ground, and will give the boundaries of the bed. Let the foundation be laid with faggots or any rough materials, and upon these lay the longest and rankest of the dung; then begin to throw up the mass of dung which has been prepared, not in large quantities at a time, but by shaking it out lightly with a fork, distributing the long and short equally over the bed, and then beating it down with the fork only; but it must on no account be trodden down. If during the building of the bed the dung should be discovered to have had too much heat in the cone, and to have assumed a whitened and mouldy appearance, it should be freely watered with tepid water, by means of a watering-pot with a rose to it. The height to which the bed is to be raised is three feet six inches in the front and four feet at the back, and as soon as it has acquired the requisite height, it should be combed all round with the fork, for the purpose of removing all loose straws, and rendering it more finished in its appearance. It is now ready to receive the frame, which should be lifted to its place, and where it should remain for four or five days, during which period the centre of the bed should be frequently forked over; but it must again be removed, to ascertain any unevenness that may have taken place from the fermenting mass having subsided, and on this occasion also, the sides of the bed should be raised from six to eight inches higher than the middle, to allow for the weight of the frame bearing it down. In about a week the surface of the bed should be covered, about six inches deep, with tan in a rather dry state, when such can be obtained, as this will be found of advantage in keeping down and regulating the rank heat which is likely to rise; if, however, the tan cannot readily be obtained, it is not indispensably requisite. The whole surface of the bed must now be covered, three inches deep, with fine soil, composed of one-half sandy loam and the other half leaf-mould; or, if that cannot be procured, sandy peat will answer as well. Under each light there should be a mound or hillock, from eight to ten inches high, and about a foot wide, on which to "ridge out" the cucumber or melon plants. The hotbed is now ready for any purpose to which the operator may think proper to apply it.

Having therefore given ample instructions as to the most improved methods of raising a hotbed, we shall next consider how it can be best employed, and how the greatest amount of benefit may be derived from it. The most general of all purposes to which it is

applied by the amateur horticulturist, is the forcing of the cucumber, and as that is in all probability the subject which he holds of the first importance, we shall in our next article communicate the necessary instructions by which any one may attain to this degree of horticultural perfection.

(To be continued.)

STRAWBERRY FORCING IN COMMON FRAMES.



ABOUT the first of March, collect a quantity of fermenting leaves and dung, and with these form a bed of about two feet in thickness, upon which a garden frame is to be placed. If the frame is deep enough, it is as well to put this heating material into it; but if otherwise, place the frame on the prepared bed. In either case it is desirable to choose a warm situation for the bed, and to have the frame set at a sharp angle or pitch facing the south. Into this bed, when properly sweetened, the pots are to be plunged to the rim, keeping them about nine inches from the glass. The fermenting material must not exceed a milk-warm heat. The chink to admit a little air by night, and still more by day, must not be forgotten. By about the middle of April the plants will be in bloom, and during that period, should the weather be mild, the lights should be tilted alternately at front and back to cause a circulation. On fine days they will even be better drawn quite off. After the fruit is set, increase the heat by admitting a less volume of fresh air; and when the ripening process is going on, treat them with more air, as when in bloom. The general treatment may be summed up thus:—The plants are kept in an airy situation when in blossom, and in a warm and moist situation, even to 100 degrees, when the fruit is swelling and colouring; they are again subjected or removed to a cooler, yet mild atmosphere, and, if possible, to where a soft warm air will play among the foliage when ripe and ripening.

The soil most suitable consists of three-fourths of turfy loam of a soft unctuous texture, not gritty, but capable of adhesion, yet not marly; one-fourth of decayed night-soil, at least three years old, and reduced to mould; these are mixed with a little sand and leaf-mould, sufficient to keep the whole open, for the free passage of air and water. Another excellent compost consists of heavy loam from old melon-beds, taking care, however, not to use the soil which formed the surface of the bed, as very frequently this contains too many of the progeny of the red-spider. To this loam add one-fourth of rotted cow-dung or any decomposed manure, and sufficient sand to keep the soil from getting sodden.

As a general rule, plants should not be shifted until the roots are well spread over the sides of the pots without getting matted. The plants should be shifted at once from the small three or four-inch pots in which they are laid into six-inch or fruiting pots. A nice point in shifting is to see that the soil put round the plant being potted is of the same consistency or firmness as the ball of the plant itself, so

that when the newly-potted plant is watered, the water will diffuse itself equally through every part. Avoid deep potting. The neck of the plant should be kept about level with the rim of the pot.

See that the pots are thoroughly clean before using, and take care that each pot is well drained, the strawberry being very impatient of wet, and liable to get out of health if imperfectly drained. The following is a good method:—Lay first over the hole of the pot one crock, or potsherd, or shell large enough to cover it, and with the hollow side down; around this place others of smaller dimensions in the same position, but with one edge resting upon the first crock, thus securing a considerable *openness* in the drainage, and making it *difficult* for it to get choked up. Next place a handful of still smaller crocks, and over the whole a layer of turf, torn to pieces by the hand, not cut by a spade, and also a dusting of soot. The turf is to prevent the soil mixing with the drainage, and it also affords food for the plants. The soot is used to check the ingress of worms, and it also acts as a manure, though not lasting. Pot firmly, particularly at the last shift. It is partly an object to get as much nourishment in as small a compass as possible, but firm potting can be overdone.

In dry warm weather the plants should be syringed every night and morning, excepting when in bloom and when the fruit is ripening. In the early period the plants will require occasional watering, while in the sunny and long days a good soaking of water is required every day. It is a rule, never to let a leaf flag, nor have the soil saturated.

Clear liquid manure should be given twice a week, from the time the fruit is set till it begins to change colour. This manure is usually made from soot and sheep-dung; but that from the horse, cow, or pigeon, or guano, either mixed or separate, will do as well. In all cases the liquid manure must be used so weak as just to colour the water. Rain or soft water should always be used, and should be of the same temperature as the frame.

ASPARAGUS.



ORIGINALLY an indigenous weed of our sea-shores, this by cultivation has become one of the most delicate and most esteemed vegetables we possess; and notwithstanding the list of names used by some growers, there is but one kind, and the only variations in it are merely those arising from situation.

The plants are obtained from seed, which should be gathered when the haulm is cut down in autumn, and preserved till the following March, when it should be sown in drills on a piece of light sandy soil, at about a foot and a half from each other. At the end of the following summer the plants may be thinned out of the rows till they stand six inches apart, and thus may remain till they are wanted for the beds. Three-year-old plants are perhaps the best for

final planting, though some recommend them to be but two years. The former are the strongest, and therefore will bear cutting soonest. It is not advisable to have them older, or they may refuse the removal. The best time to make the beds is September, and the planting done in October; but presuming circumstances have prevented autumn planting, the operation must be performed in February or March. The beds should be made on a piece of dry rich and light earth, with a heavy coat of dung trenched in, and the ground marked off into beds of the required size. Narrow beds are preferable, because the sun penetrates them more effectually, and the buds are consequently earlier. We would never plant more than three rows in each bed, and, therefore, they need not be more than three feet wide, which will leave the plants nine inches from each other, and the same distance from the outsides. Unless the ground is naturally wet and springy, it is not necessary to elevate the beds at the planting, but is preferable to make them on the level, merely throwing about three inches of the soil from the alleys over the plants when they are in their places. The alleys should be a foot and a half wide, and at the corners of the beds stout stakes may be driven in, that at the future dressings it may be easy to tell where the outsides should be. The beds will only require to be kept free from weeds until the following autumn, when a good dressing of manure should be given them, first forking up the surface of the bed, then laying on the dung, and covering it with soil from the alleys; and this should be repeated annually, and may be called the winter dressing. In spring the beds should be carefully forked over, so as to loosen all the soil without injuring the crowns of the plants, and the soil raked down into the alleys till the plants are about an inch below the surface: this requires to be done just before the plants begin to grow—if done sooner they may be injured by frost, and if left till a later period some will get broken by the rake. Asparagus should not be cut till the third season after planting, nor should the cutting be continued too long, or, as a matter of course, the roots are greatly weakened, and the produce of the following year will be inferior. At the autumn dressing, after the plants have attained a size and strength sufficient to become useful, salt may be used with the manure to great advantage, laying a moderately thin coat of it along with the dung over the whole of the bed, and covering in the usual way. In establishments of any pretensions Asparagus forms a considerable item among the forced productions. For this purpose it is usual to take old roots from the beds in the autumn, and at intervals, proportionate to the required supply, hotbeds of moderate strength are made, and when the heat becomes steady at 55°, the bed is covered with light earth and the roots placed thereon; an erroneous practice then follows of earthing up the shoots as they grow, in order, it is said, to make them look white and tender. It is altogether a mistake to value Asparagus for its blanched stems, and whether grown in the ordinary bed out-of-doors, or at an earlier season as a forced vegetable, as much length and substance should be got above ground as possible, for it is only the green portion that can be eaten, the blanched part being totally useless. We would advise, instead

of earthing up the stems, to throw off the lights, as much as the weather will permit, to induce a sturdy thickened growth, and thus by the admission of plenty of air prevent the blanching process.

When Asparagus is required in any quantity at an early season, a much better method of forcing will be found in the following course. The ordinary beds in the garden should be reduced in width to about two feet and a half, or as narrow as the roots of the plants will allow, and the sides of the beds be cased up with four-inch pigeon-holed brickwork; on the top of the beds a light framework of wood is fixed in the manner of a ridge roof, to the middle of which canvas frames are hung, so as to protect the young shoots from cold and wet; glazed frames would be preferable and glass best of all. The alleys, which are now two feet wide, are filled with hot dung, the warmth from which, striking through the beds, starts the plants into an active growth; and in consequence of their being thoroughly established, having an abundance of healthy roots uninjured by removal, they break with a vigour unknown to such as are taken up to force in frames. The advantages of this method are self-evident, and a comparison between it and the common mode will make them so strongly apparent as to need no arguing. By the usual course the plants are mutilated in their roots, and then suddenly placed in a comparatively strong heat; and when they have borne this torturing, and yielded the weakly produce consequent on such unnatural treatment, are cast away as refuse. While, on the other hand, Asparagus forced in the bed has all its roots in exactly the condition to make the greatest return, and afterwards has only to be gradually inured to the open air at the approach of summer, when its stems will grow up and recruit the plants to the full as much as though it had not been subject to more than the ordinary cutting, and prepare them for a similar course in the next season, thus affording a superior produce without any waste and at an earlier and long continued period. Of course it is necessary through the winter to protect the beds with mats or litter in severe weather, and to turn and renew the heating material as occasion requires, so that a degree of heat may be imparted to the bed equal to about 50° Fahrenheit, and the summer management of such beds will be precisely that of any common one; the heat of the dung in the alleys will be preserved and economized if wooden shutters are made to fit closely over it, which a wooden plate, running the length of the bed on the top of the brickwork, will afford a ready means of fixing, and will also keep the path clean and neat, and facilitate the cutting, and general management of the beds. Six weeks is generally consumed in starting the beds, reckoning from the time when the dung is first wheeled into the alleys till the beds are fit to cut, supposing the forcing to commence in November, and they will continue to furnish a supply for nearly three months.

BEETROOT.



HIS delicious vegetable is very little known excepting as a garnish, and to give a colour to pickled cabbage, and then only in a raw state. It ought to be admitted to every table, for a more wholesome, nutritious, and delicate esculent is not to be found. It is thus managed:— Let it be washed and brushed, not scraped as a carrot is prepared. The head, that is the short stalks which have borne the leaves, also the small end and side rootlets, are all to be left on during the time of boiling, care being taken not to wound the skin till it is done, because the fine, rich colour will escape, and leave the root pale and unsightly. The time they take to boil will depend on the size; from three quarters of an hour to an hour and a half.

When it is ready, let it be peeled and trimmed, and sent to table. All that may remain after dinner should be cut into slices about a quarter of an inch in thickness, these are to be laid neatly in vegetable dishes, and vinegar is to be poured over the whole. By the next day at dinner-time, or even the same night, it will be ready; and if eaten either at supper alone, with pepper, salt, oil, and vinegar, or as an adjunct to cold or even hot meat, it will be found an admirable addition to both meals.

It becomes a very mild kind of pickle, and is exceedingly salutary if eaten with salted meat. In this state it will keep for a fortnight. This garden beetroot is not the same from which sugar is made: *that* is the white beet; it grows, and much resembles in appearance mangel wurzel.

THE GARDEN GUIDE FOR FEBRUARY.

FLOWER GARDEN.



ALL alterations and improvements should be attended to at once, and this is the best season for making box and other edgings. Fork up and manure the beds. Plant ranunculuses and anemones. Herbaceous plants may be divided and transplanted. Top-dress auriculas, pansies, carnations, and roses to strengthen the bloom. About the middle of the month, if the weather is open, you may commence pruning some of the hardy kinds of roses—the Moss, the Provence, China, and others that flower in June and July. The Perpetuals are better left till March and April. Roses on poles or against buildings may be undone and thinned out, and where the poles are decaying new ones should be supplied. Look to the standards—clean the stems, and where any stout branches have been cut away, cover the tops with a little grafting-wax, that insects may not deposit their eggs in the pith. All plants under glass should have as much air as the weather will permit. Sow hardy annuals in the borders, and a few in frames to be transplanted for early bloom. Auriculas commence their spring growth this month, and should be moved into a southern aspect; and two or three mats should be thrown over the frames at night if frost is expected. This is the best time to remove offsets, as they root more freely than later in the season. The safest plan for their removal is to break them off the old plant with care, and avoid using the knife as much as possible. Calceolarias should now be shifted, and heating materials prepared for starting dahlias. Should numbers be a consideration, commence at once. Tulips will now require more care; continue protection nightly and against storms of

hail. After the late amount of wet, it will benefit pinks to move the soil between them. Give carnations and picotees as much air as possible, and if not already cleaned of decaying foliage, let it be at once attended to.

KITCHEN GARDEN.

The weather has been so unfavourable for ground work, that we fear much remains to be done in carrying out manure dressing, etc. If the weather should set in frosty, manure may be wheeled to the most convenient spot for dressing those parts which will soon become vacant. Fork the ground between the crops of cabbage, and all other crops that are beginning to move; and as soon as the state of the ground will permit, dig, trench, and prepare for the various crops to come. Prepare pea-sticks, also sticks that will be required for all other purposes. New beds of asparagus may be made, and seed sown for new stock. Force rhubarb, seakale, and asparagus. Should the weather be fine and dry, a little of nearly every kitchen crop may be sown during the month; some will be lost, but others will succeed and give early gatherings. Peas, broad-beans, parsnips, beet, onions, horn carrot, spinach, and cabbage may be sown; and if some slight protection can be given, cauliflower, radish, small salad, and lettuce. Plant garlic, shallots, chives, onions for seed, and bulbs of the tree-onion. Plant early kinds of potato under a south wall; they will, if they succeed, come into use in May. Make new plantations of horseradish; let the sets be about four inches long; cut off the green crown, and plant so that the top of the set may be twelve inches below the surface. Sow celery in pots or boxes in a slight hot-bed for a forward crop. Plant out cabbages for a second crop, and sow seed for July cutting. In sowing peas, let the rows be eighteen or twenty inches apart; they will succeed better than if sown closer. The spaces between them may be planted with other vegetables, viz., rows of spinach, rows of lettuces, etc., so that no room is lost by allowing the peas full space. Continue to cover seakale as it is required. If covered with dung eighteen inches thick, you may calculate on a crop for use in five or six weeks.

FRUIT GARDEN.

Where strawberry beds were not made in the autumn, they may be made early this month; they should be planted at once in rich firm ground. Bush fruits may still be planted and pruned, and all pruning of fruit-trees generally should be attended to; but do not attempt pruning in frosty weather. Grafting should be performed as the weather permits; but if scions are obtained before they can be used, thrust them into the ground in bunches with a tally to each, and they will keep a month if necessary; and usually take better if so kept a week or ten days before being put on the stocks. If the weather is favourable, apricots may be pruned and nailed towards the middle of the month, and coverings for the protection of the blossom should be provided in time, whether it be netting or the more preferable canvas curtains. Figs that have been protected should be uncovered towards the end of the month, and pruned if necessary. Examine cherries and plums, and clear out all cankered wounds; and if of any depth, fill the holes with cow-dung and clay well mixed together. Raspberries, currants, and gooseberries should now be cut and pruned, and vacancies filled up. Remember in planting to plant firmly, and put stakes to all things likely to be shaken by the March winds. All trees affected last year with American blight should now be gone over with a brush dipped in strong brine.

GREENHOUSE AND CONSERVATORY.

The plants will now be commencing their spring growth, and an abundant supply of air must be given provided the weather is favourable; but cold draughts and frosts must be guarded against, as during this month most greenhouse plants are more susceptible of cold than at any other time of the year. All plants requiring it should have a shift, and water given regularly to such as are making free growth, taking care that it is of the same temperature as the house. Camellias coming into flower will be much benefited by being syringed twice or thrice a week. Those done blooming should be placed in temperature of 65°, with a moist atmosphere, and partly shaded to promote the growth of new wood.

Commence the general work of spring propagation by striking cuttings of petunias, geraniums, verbenas, etc., for bedding out. Strong cuttings of geraniums that were struck round the sides of pots in autumn, may be got into small pots, and shifted on as fast as their new roots touch the sides. Lose no time in forwarding everything for the different operations to come. Provide an abundant supply of the various soils required, that all may be ready, and in a fit condition for immediate use when wanted. Look closely after insects, especially green-fly and red-spider, and remove plants affected to some convenient place, and fumigate with sulphur and tobacco, as necessary. Average temperature this month, 45° at night, 50° to 60° by day.

STOVE.

The temperature this month should range from 50° to 60° by fire-heat, subject to a rise from the power of the sun. Give air with care daily, but avoid cold draughts near growing plants. Attend to the atmosphere of the house; keep it healthy and somewhat humid, using water sparingly till you find the plants are growing freely, when a more liberal supply will be necessary. Prune and repot such plants as may require it. Remove a portion of the old soil from Allemandras, Clerodendrons, Stephanotis, Dipladenias, and others of similar habit, and give a dressing of fresh soil, composed of good turfy loam and peat, adding a little leaf-mould, broken charcoal, and silver-sand. Gesneras, Achimenes, and Gloxinias may be started into growth, using the same sort of compost as above, with the addition of a little well-decomposed horse manure.

PITS AND FRAMES.

Look well after mildew, and dress with sulphur as soon as it appears. Young plants must be carefully protected from frost, but at the same time should be kept free from excess of damp. If the weather is not frosty, the lights may be wholly withdrawn for some hours in the daytime. Clean and top-dress the plants, and shift into the greenhouse such as want a start. Remove all dead leaves, and keep the shelves or plunging material moderately dry. Water with caution, but take care that no plant perishes for the want of it. Geraniums will require very little. In fact, all tender plants that have been wintered in cold frames must have very little water at present; they may be growing in consequence of the mildness of the weather, yet, as frost may visit us, much moisture will be injurious, and losses may occur. Ferns and calceolarias may have water freely if well drained.

TO CORRESPONDENTS.

EXOTIC FERNS.—*Alpha*.—Repot these when just about to commence their new seasonal growth. The soil must depend upon the species, but as a rule turfy peat two parts, and sandy loam one part, will grow stove ferns well. Some like rotted wood, and they are all partial to leaf-mould.

WIREWORM AND AMERICAN BLIGHT.—A correspondent writes:—Some time ago these disgusting little animals infested my seakale to such an extent that all my finest roots were eaten through and snapped off. What was to be done? No one could tell me. Well, it struck me it was worth while to try a remedy which once saved my celery from being disturbed by a grub which had fixed on its roots, and that was a *good steeping of soapsuds*; and an admirable remedy it was, acting two ways—killing the grub and benefiting as a manure. I therefore tried it on the seakale, and found it most effectual, completely clearing the plant of the wireworm, and making it grow and flourish. I have now followed out this plan for years, and have a barrel fixed on wheels, into which the laundry-maids pour the suds, and the gardener takes them into the garden, and applies them where wanted. The slugs too attack a variety of things, but the suds are effectual in destroying all these enemies, and, as I have already observed, is useful as a manure. You may apply suds also with a paint-brush to your apple trees when infested with American blight, though for this purpose a lather of soft-soap is better.

FRUIT TREES ON WALLS.—*J. P.*—Everything in the way of soil and situation may be for the best, but this is of no avail if the trees are infested with insects. No

trees suffer more from their attacks than the peach and nectarine against old walls to dress the trees with any composition is of very little service, while there are myriads of insects safely sheltered in the nail-holes and crevices of the wall. Loosen the trees from the wall, and let the wall be washed with a mixture of cement, fresh lime, soot, and sulphur, mixed with soapsuds to the consistence of thick paint, and laid on with a brush so as to fill the nail-holes and crevices, and consequently destroy all insects that may be harboured there. The proportions of the mixture may be two parts Portland cement, one part fresh burnt lime, two parts soot, and one-half part sulphur, with sufficient soapsuds to make it of the proper consistency.

TANK IN PROPAGATING HOUSE.—*H. T.*—You are quite right in conjecturing that to carry a pipe through the tank might result in leakage. It can be done, of course, but there is no need to incur the risk. Let the pipe dip and rise again; the interruption to the circulation will be too trifling to take notice of, especially if the pipe rises a little after the dip, which perhaps you can manage. The ventilation of the propagating house must be in part determined by the position of the pipes. If these are near the ground, have ventilators close to them, for the air to be quickly warmed as it enters, but top ventilation will do with careful management. In any case a propagating house requires but little air, but it must have a little, and in the gentlest way possible.

W. B., Woolwich.—We thank you for your kind offer, but are unable to accept it.

LYCOPODIUMS AND FERNS.—*C. Y. H.*—If you cannot obtain peat, use as a substitute, light sandy loam, with one-fourth well-decomposed leaf-mould, some sand, and a small portion of chopped moss. Put plenty of drainage in the pots, and pot lightly.

Oxon.—We cannot answer your query. If properly answered it would amount to an advertisement.

PRIMULA.—*A. B.*—From your description we cannot judge whether the plant was a primula or not, but large specimens of primula may be produced by nipping out the flower-buds as soon as they are sufficiently advanced. Do not attempt to keep the plants a second season, as they invariably rot off just above the soil, and the flowers are always small in size and poor in colour, compared with young plants. Perhaps your plant resembled the primulas referred to on page 96 of last year's volume.

PRUNING FRUIT TREES.—*R. T. K.*—As stated in the lecture, we are not prepared to lay down a rule that a fruit tree should never be pruned in any way whatever, but we do say that pruning is a delicate business, and is generally done too much. See page 86 of last year's volume. The subject is too extensive for us to devote space to it here, but it will be treated on in Mr. Hibberd's new book, *THE AMATEUR'S KITCHEN GARDEN*, which will appear shortly. Thanks for your references concerning "Lilies of the Field."

FROZEN PLANTS.—*Woodville.*—The best method to recover plants touched with frost, is to thaw them as slowly as possible in the dark. Light and moisture at such a time are ruin to plants of delicate constitution, and if they recover at all it is only by thawing them gradually in some place only one or two degrees warmer than freezing point.

LIME AS A MANURE.—*Junior.*—Lime will be a capital dressing on your heavy loam, which has been untilled for years, especially to prepare it for potatoes. Use one bushel to every three perches.

PUTTY.—*G. H. Layton.*—Greenhouse putty should be made of whiting and linseed oil, well worked and left in a lump to "sweat" for eight or nine days before using it. No other ingredient is required. Whitelead will cause it to harden quickly, but should never be used for that very reason, for if an accident happens, the putty made as above may be cut with a knife for many years afterwards, and a square put in without difficulty. Sashes should be primed and painted before being glazed, and after glazing should not be painted for two or three months.

GLOXINIAS.—*Polly.*—Gloxinias should be started at once; the heat should be gradual at first. They ought to do well in the moist heat of a cucumber frame.

PROPAGATING CASE.—*A. E. W.*—A description of a propagating case shall appear in the March number.



CANTHUS PRUNIFOLIA VARIEGATA.

CRATÆGUS PRUNIFOLIA VARIEGATA.



O the hawthorn the gardener is indebted for some of the neatest ornaments, its judicious employment effecting a finish not otherwise obtainable; its neat foliage, and profuse and early habit of flowering, render it extremely pleasing in spring, and its bright and various-coloured berries render it equally interesting in autumn and winter. The thorn in age is one of the most grotesque trees we have; the rigid contortions of its stem and branches are bold and striking, and as single specimens or in scattered groups upon an extensive lawn or park, nothing is more effective. *C. oxycantha*, the common hawthorn, is an invaluable hedge plant, and as such is extensively used; its varieties, the double red and white flowering thorns, are very beautiful, and as short standards in the shrubbery are very desirable, as also is the yellow-berried variety, which in autumn is particularly conspicuous. The subject of our illustration, *C. prunifolia variegata*, is perfectly hardy, and its beautiful foliage makes it a great addition to our ornamental foliage plants. Any ordinary soil will suit it, a good loam being preferable for it to a soil highly manured, as the beautiful variegation of the foliage is likely to be affected by too rich a soil. Propagation may be effected by means of seed and grafting. All but the double-flowering kinds of thorn produce seed in abundance, which should be collected in autumn, and buried in damp sand till the following February, when it may be sown in beds of light earth. Some of the seeds will germinate the same season, and some not until the year following. The young plants should be transplanted when two years old, and at four years are best for final planting. It may also be propagated by grafting on the common hawthorn, and March is the best month for the operation.

 WINDOW GARDENING.

BY JOHN B. MOLLISON.

(Continued from page 42.)

SOIL AND DRAINAGE.



WHAT we must now consider is the suitable kinds of soil required, and the proper drainage for a pot before the plant is put in it. A very accommodating mixture suitable for nearly all kinds of plants in pots is composed of one part of turfy loam, one part of leaf mould, and barely one part of silver-sand, with one half part of dried cow-dung, rubbed down fine, added. The cow-dung gives a robust healthy constitution to soft-wooded plants, such as geraniums, fuchsias, cinerarias, calceolarias, and many others. The manure should be left out, how-

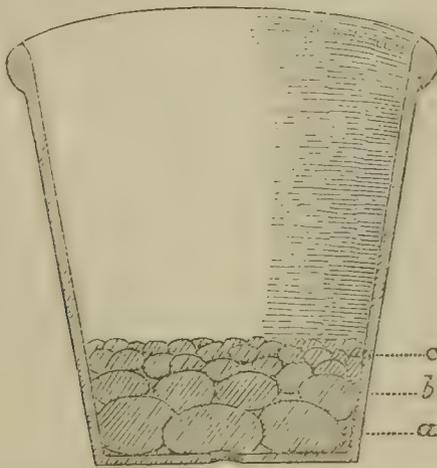
ever, in potting ferns, mosses, the cactus tribe, and all peat-loving plants in general, which should have one part of nice fibry peat added instead. For quick-growing soft-wooded plants a pinch or two of ground bones may be added with advantage. Any nurseryman will supply you with as much mixed soil for a few pence as would fill a dozen pots, or if you have a gardener friend he will see you put right. When ordering soil for potting from a nurseryman, state the kind of plants you intend potting, and he will give you soil accordingly. When potting peat-loving plants, such as heaths, no turfy loam is required, but peat earth, leaf-mould, and a liberal supply of silver-sand. The cactus tribe are always benefited by a quantity of small-broken brick being added.

You should never use common garden soil in potting plants, for it is always too finely pulverized, and greatly deficient in the natural food required by a healthy pot-plant. By being potted in such soil, the ball of the plant by frequent watering becomes a close sodden mass, through which the roots are very unwilling to penetrate; when this takes place the roots begin to decay, and the plant falls into a state of premature decline. The kind of soil you require is an open fibry compost through which the air can penetrate, and the water pass freely away, enabling the roots to extract the essential gases so necessary to the life of the plant. Turfy loam or peat earth, according to the class of plants you intend to pot, should therefore be the principal part of your compost. Turfy loam is the turf cut from good old pasture to the depth of four or five inches, selected as fibry as you can get it, and laid up for six months or so in a heap to rot. Peat earth is the turf cut from a selected part of heathy common, having plenty of fibry matter, with a sprinkling of sharp silver-sand running through it, and laid up also to rot before using. When you prepare your turf for potting, chop it up small with a chopper or spade, but never sift it, for the turfy matter gradually decomposing in the pot affords the most natural food required for the health and well-being of your plants. Leaf-mould is formed from the leaves of autumn gathered together, and stored away in a heap to rot. They require to be turned over in the heap several times during the year to hasten their decay. They are fit for use after having lain one year or more. Before using leaf-mould pass it through a sieve to remove all stones, sticks, and other rubbish gathered with the leaves. Silver-sand is the best sand to use, but when not obtainable, river or pit sand, if pretty sharp, will do very well instead. You must never use sea-sand because of the salt it contains, which would very likely kill your plants. In making up your compost, carefully keep out all worms and pieces of wood. Pieces of wood and beach must often cause a white fungus to germinate among the roots, throwing the plant into an unhealthy state.

The soil being now ready, we will turn our attention to one of the most important things to be considered in potting plants—that is, free drainage; this is absolutely necessary for their health and well-being. If the drainage is bad, and the crock-hole gets choked up, the surplus water does not run off, but lodges in the ball, which

soon gets soured and sodden, rotting the roots and throwing the poor plant into an unhealthy state, and then it leads a miserable life till its owner gets tired of it and throws it away, or allows it to die a wretched death of itself. Many a plant is destroyed through neglecting this apparently simple thing, which would have been a credit to its owner had it been properly drained. To prevent you falling into this easy mistake, I will try to tell you how to give your plants proper drainage.

For ordinary greenhouse plants, in six or seven-inch pots, place one large crock—that is, broken pot—the concave side undermost over the crock-hole in the bottom; put neatly over that again three or four smaller pieces; then a quantity of small broken crock,



a, b, c are three layers of crocks or potsherds, the largest at the bottom, the smallest at the top.

covering all with a little moss or the roughest of your compost, to prevent the soil from being washed down into the drainage. For smaller, three or four-inch pots, one crock and a little moss is sufficient. Larger pots will require more drainage, while for ferns and cacti nearly one-third of the pot should be drainage. An oyster-shell is a capital thing for the main-drainage crock. This is what may be called proper drainage. Too little is bad, while too much is needless, as it only takes up room in a pot which should be occupied with food for the roots.

Drainage will get choked up sometimes. One great cause of this is earth-worms, which must be hunted for as soon as you perceive traces of them. You will soon know if a worm is present in the soil by its casts upon the surface. If you have a suspicion that there is a worm present, turn out the ball of the plant and search for it. The proper way to do this is to take the neck of the plant between the fore and middle fingers of the left hand, placing the bottom of the pot in the right, then turn it over and give the rim of the pot a rap or two on the table, and the ball will loosen freely.

Take the pot gently off with the right hand, taking care not to disturb the drainage, and you will see at once by the appearance of the ball if a worm is there, as if so the runs or channels will be traceable all round, and most likely you will find the rascal lying lengthways in one of them. It is sometimes difficult to get the worm out, for it disappears from view if not taken firm hold of quickly. In replacing the pot on the ball do not disturb the drainage. A smart bump or two on the table will settle the plant into its old position.

To water with soap-suds is another way of catching them, and also water that a few pieces of lime have been slaked in. This makes them rise to the surface, and then they are easily caught.

Worms are a great nuisance in a flower-pot, for they not only feed on the strength of the soil, but they also break numbers of small fibrous roots, and make the ball loose and broken; all which evils very soon tell on the health of the poor plant. In order to prevent this, worms should be carefully looked for before the soil is used; but even after that they may appear, for very small ones and eggs will escape notice.

In giving drainage to window-boxes you must proceed much in the same way as for pots, covering each hole with a large crock, and an inch or more of broken tile or crocks over it, the whole being covered with a little sphagnum moss to keep the drainage clean.

There are many different kinds of manures and fertilizers used for pot plants. The most easily come at sometimes are a few sheep droppings or dry cow-dung; but the best for mixing with the soil is bone-meal, or bones ground down, mixed with a very small quantity of lime. For top-dressing or mixing in the water a thimbleful of guano is very good. But I think you will find "Standen's Gardener and Amateur's Friend" preferable to any other fertilizer. It is sold by all seedsmen and nurserymen in canisters, with full directions how to apply it. Liquid ammonia is an excellent fertilizer, ten drops to a quart of water being sufficient. It is very easily applied and no dirt attending it. A very safe liquid manure is made with sheep-droppings dissolved in water, not too strong, just sufficient to give the water a dark brown appearance. Tobacco-water is also a good manure, and so is very weak glue-water. Manures applied to the soil should be well incorporated with the mass by frequent turning. Liquid manure should be applied as often as twice a week, or once a week at any rate.

We will now proceed to consider the very important operations of potting and watering. Watering, especially, is the very life and mainstay of a plant. To know when and how to water is one, if not the greatest, secret of good plant cultivation. I hope to make you understand this before I have done. One important consideration in potting is to have your soil in a proper state, neither too wet nor yet too dry—just a medium state between. If too wet, the soil bakes hard together and the roots have no free action; if nearly dust dry, you cannot have the ball of the proper firmness all through, and watering at first is very difficult.

You should have the pots clean, inside and out, before you begin

to pot. If the pot has been in use before, the remains of its former occupant may not suit the taste of the new one. It is a general saying with gardeners, "One plant's food is another plant's poison." The roots of a plant always seek the outside of the ball, forming a dense network all round the inside of the pot; any deleterious matter would thus be sure to tell on the health of the plant, which will not be the case if the pot is washed before using.

After giving the pot what you consider proper drainage, put in a little soil, then take the plant by the neck with your hand, let the roots hang loosely in the pot, keep the neck of the plant fair in the centre, and with the other hand heap up the soil loosely in the pot. Bump it down smartly several times, pressing home the soil with the thumbs at the same time. This insures the ball of the plant being of the same firmness throughout. In shifting an established plant into a larger pot, proceed in the same way, keeping the plant in the centre and the surface of the ball a little below the level of the pot, taking care that all round the sides is properly filled in, no vacancies being left; a moderate ramming down with a stick will insure this being done. Always leave room for watering; and with a settling bump or two to the pot, the potting is completed.

After potting, water with a fine rose, if you have one, if not, pour the water on gently, but do not by any means give too much at first. Just give enough to settle the soil, and let it rest for some hours before you give any more. Giving too much, or, as I may say, soaking the ball at first, does the plant harm, as it makes the ball like a puddle. A little at first settles the soil, and when you water again, the water percolates freely through the ball and drains away at once.

In shifting a plant into a larger sized pot, the proper rule is to select a pot in which the one you are to shift from can stand easily. A rooted cutting should only have a three or four-inch pot at first, and be shifted into a larger when the pot is full of roots. I would not recommend you to grow plants in any larger size than an eight-inch pot. Six or seven inch is the most convenient size for window plants. If plants such as fuchsias or geraniums have outgrown the eight-inch size, it is best to cut them back and reduce the ball so as to allow room for fresh soil in the same pot. Cape geraniums—those with the large partly-coloured flowers—should always be cut back after flowering to the second eye on each branch, and potted back into a smaller pot, from which they can be shifted into the larger size again in the early spring after they have made some growth.

Window plants should always stand in flats to keep the window dry. The water which settles down into the flats after watering should always be thrown out, as it is injurious to the plants to let it remain, tending to rot the roots by keeping the ball too moist and preventing the action of drainage. The proper time and way to water plants is very little understood by some people. Through excess of kindness they make a point of watering their plants at stated times without considering whether it is required or not, and often the poor plants are killed through this excess of attention

Let me tell you that too frequent watering is most injurious. To avoid this evil it is necessary to have a rule to guide you. Well, then, never water plants unless they really require it; you will soon learn to know by experience when they do want watering. A good rule to know the proper time by is when the surface of the ball looks dryish. But an unfailing guide is to rap the side of the pot with your knuckles: if it gives out a ringing sound, the plant is dry, and you should water immediately; but if the sound is dull and solid, then no watering is required. To learn the distinction between the two sounds, fill two pots with soil, one dry and the other damp; water the damp one, and you will learn at once, by rapping them, the difference in the sound which they give out.

The roots of plants have a very limited range in flower-pots, so particular attention should be paid that they do not get too dry; and when you do water, give sufficient to soak the ball thoroughly, and then withhold it till required again. A little water on the surface is almost useless. In winter plants need watering very seldom, as they naturally sink into a state of rest during that season. In the summer season they will require water very often—every day, in fact, if the weather is warm. The best time to water in the summer is the evening, for during the night the plants get refreshed and enjoy the benefit of the watering before the sun rises on them again. As watering is the very life of the plant you should now and then put a little guano into the water, but be very careful not to give too much, as it may burn the roots; a thimbleful to a quart of water is quite sufficient, and twice a week often enough during the season. A very safe and cool liquid manure may be made by sheep-droppings dissolved in water; just enough to give it a dark appearance—not muddy. This is a safe and capital liquid manure for plants. Liquid manure should not be given oftener than twice a week.

The extremities of the fibrous roots act as so many mouths, extracting all the food contained in the water; the water at the same time converting the nourishing matters contained in the soil into a fit state for absorption by the many little mouths into the body of the plant, passing into and creating beautiful foliage and blossom in endless variety to delight our eyes. And so on goes Nature—the mother of change—in her ceaseless round of absorption and creation, filling the contemplative mind with wonder and awe at the mighty power present in its hidden workings.

In filling window-boxes with soil after the drainage is in, the box should be heaped up at once, and the whole shaken down and pressed together, so that the soil may be of the same firmness throughout, care being taken to press it well into the corners. Every morning and evening your plants should be sprinkled overhead to keep dust off them and induce a robust, healthy vigour in their growth.

Rain water is the best for watering all kinds of plants. It is Nature's own providing, and contains far more nourishment than hard water. Always use rain water if you can get it; if not, put a little bit of soda into the hard water, and let it stand in the sun some time to soften. You should never water your plants with water

below the temperature of your room. To give plants colder water than the air they live in chills their roots and checks their action, which is a thing you must guard against. Therefore if the water is coldish when you wish to use it, add a little boiling water to take the chill off; sixty-five or seventy degrees is the proper temperature for watering with. The surface of the ball, every now and then, should be pricked over with a pointed stick to allow the water to percolate freely through the whole ball, for when the surface is hard the water mostly runs down between the pot and the ball, and the heart of the ball is often left dry when you think the plant has been properly watered. The plant by that state of matters leads a life of semi-starvation; besides, when the surface of the ball is caked, the air does not get free passage to the roots, telling greatly against their healthy action.

Now, dear readers, here we have arrived at an advanced stage of our window gardening. We now have our plants potted, watered, and placed in their positions, where we expect to enjoy all the beauty and grace of the floral display we have been labouring for; hour by hour and day by day they grow and bloom, yielding an amount of pleasure, interest, and affection which we never imagined window flowers to have the power of arousing, till we took their cultivation under our care. Now we feel it to be really a labour of love when we spend a few spare minutes attending to their wants.

(To be continued.)

DIELYTRA SPECTABILIS.



FEW of our readers who are acquainted with this plant will, we imagine, be disposed to differ from us, if we venture to pronounce it not only the handsomest of its order—the Fumeworts—but even of all spring-flowering herbaceous plants. One species, *D. formosa*, is an old inhabitant of our gardens; but although a pretty, graceful plant, it is altogether eclipsed by the elegant *D. spectabilis*. Adapted equally for cultivation in the open border, for the window, or for forcing in early spring, it possesses a threefold claim upon the lover of flowers; and there can be no doubt that it will soon gain as high a place in the estimation of English gardeners, as it has long enjoyed among the Mandarins of its native provinces. In suitable soil, the plant attains the height of eighteen inches, the stems bearing both leaves and flowers; and by this circumstance, as well as by its large size, it is distinguished from all the other species at present known, which have radical leaves only.

The handsome spreading foliage is biternate, with the leaflets toothed, or cut into ovate segments. The flowers, each nearly one and a half inch long, and one inch in breadth, are borne in racemes, which are both terminal and axillary; but the terminal racemes of an established plant will frequently consist of ten or fifteen blossoms; the axillary flowers are less numerous. The sepals, two in number, as in all the plants of the order, falling off at a very early stage of

their growth, will be found only on the immature buds at the extremity of the raceme.

Whether seen before expansion, when the swollen flowers present a singularly heart-shaped form, or after the lips of the two outer petals have become reflexed, we know of but few plants so strikingly elegant, and withal so unusual in their appearance.

CULTIVATION.—When grown in the open borders, it will be advisable to plant it in soil only moderately retentive; for, although there can be no doubt that it is quite hardy, it will be prudent to guard against the evils resulting from too great a degree of moisture in the soil. In sandy loam it would be perfectly safe, but the plant would be less robust in its habit, and produce fewer flowers.

We are by no means friendly to the indiscriminate use of supports in the flower-garden; but the stems of the Fumeworts being somewhat brittle and succulent, it will be desirable to secure the principal stalk of the plant to a slight rod, which, if not too long and obtrusive, can be employed without in any degree detracting from its graceful mode of growth.

When cultivated in wet soils, much risk may be obviated by protecting the roots in winter with some impervious covering: in the absence of anything more suitable, an ordinary pot may be employed for this purpose.

When grown as a window plant, it produces its flowers a month earlier than when exposed to the rude changes of an English spring. In cultivating it with this view, the plant, after flowering, should be allowed to remain outdoors during the summer and autumn until the stems have died down and the fleshy roots become dormant, when, at the approach of winter, the pot may be removed to the window of a cool room, the soil being kept in a slightly moistened condition. While dormant, and during the first stages of its growth, it may be placed in a fire-warmed apartment, though we do *not* recommend such a course; but when the plant has made some progress, and the leaves are fully expanded, the dry atmosphere of the heated room would be prejudicial to its health, and the pores of its delicate foliage become choked with dust; if kept at rather a low temperature, its flowers will continue in perfection for a considerable period.

For a strong plant, a pot of not less than six or eight inches diameter is desirable, and the soil may be a rich loam, such as would be produced by the gradual decay of turf from an old pasture; or, in the absence of this, any good garden soil, mixing it when deficient in vegetable matter with a little peat or leaf-mould, and when too sandy with a portion of good loam; for we have not to fear the effects of the frost, as in the open border.

The directions we have given for its growth in pots, apply only to those cases in which no other accommodation is available than that afforded by a window; but where there is the convenience of a cold frame—an auxiliary we should be glad to find in every garden even of the smallest extent—the plant will, as a matter of course, be allowed to winter there, and need only be removed to the window when the flowers are partially developed.

The plant may be increased by careful division of the roots in

early spring, or by cuttings taken off at a joint, and stuck in white sand under a hand-glass. From their succulent nature, some care is necessary to prevent the cuttings from damping off, and to avoid this the glass must be wiped every day, and removed at the earliest period after they have emitted roots.

The plant will occasionally produce seeds, which may be sown as soon as ripe; in which case, it will be advisable to protect the young plants during the first winter, or the sowing may be deferred until the following spring, when the plants would, if raised early in the year, acquire sufficient strength to bear exposure in the open air in the ensuing winter.

The genus *Dielytra* (Gr. *Dis*, two, and *elytron*, a pouch or purse) is so named, in allusion to the inflation of the two outer petals at their base. Four other species are known in addition to that now figured—*D. formosa*, previously referred to; *cucullaria*; *eximia*, a handsome species still rather rare; and *canadensis*—all natives of North America.

Few gardens are without some species of *Fumaria* or *Corydalis*, two genera closely allied to that to which our subject belongs; and it may, therefore, not be altogether uninteresting if we notice the principal points of difference between them and the present genus. Both differ from *Dielytra* in having but *one* petal spurred; and the three genera are further distinguished from each other by the seed vessel; this in *Fumaria* is a *one*-seeded indehiscent nut, and in *Corydalis* and *Dielytra*, a *many*-seeded pod opening by two valves, which in *Corydalis* is more compressed than in the last-mentioned genus.

Our plant appears to have been known to Linnæus under the name of *Fumaria spectabilis*, but it is only since its reintroduction into England in 1846, from the North of China, by the London Horticultural Society, through the medium of their collector, Mr. Fortune, that it has come into general cultivation in this country.

THE CULTIVATION OF ALPINES.



THE term "Alpine," taken in its widest sense, as applied to a class of plants, implies not only those small interesting objects which are found in elevated situations, but all the diminutive perennial plants found in any situation whatever, not being actually aquatic. This tribe of plants has of recent years been very much neglected, owing, I apprehend, to their habits in general, and the materials most congenial to their growth, not being properly understood by gardeners: indeed there are but few persons who seem disposed to make a sufficient enquiry into their habits or character, to enable them to grow them successfully. It is a very general, though certainly a most mistaken notion, that because many of them grow on the summit of mountains, and in other very exposed situations, they are capable of enduring an intense degree of cold, and are therefore

left unprotected during the winter; but, from this cause, many of them perish—a conclusion which might easily be arrived at, were we to take into consideration our very variable climate, and the consequent fluctuation of heat and cold, humidity and moisture, to which these plants are subjected in this country. By a careful examination into the circumstances in which they are naturally placed, it will be found that, so far from their being exposed to any sudden transition of temperature, or to the action of intense cold, they are, during the winter season, or the greater part of it, enveloped in snow, which is impervious to severe frosts, and forms a protecting screen equal, if not superior, to any the art of man can apply, at least where there is any bulk of it, because it is then maintained at a very trifling degree below freezing point, its surface merely being affected by cold or heat. The plants, whilst in this state, exist in comparative inaction, but in a uniform state as regards heat and moisture—so that, whatever change takes place, it is so gradual, that little or no injury can take place. It cannot therefore seem strange at the want of success which is, for the most part, realized in their cultivation. I will now briefly state the manner in which I have grown them, and which has been attended with considerable success. About the beginning of August they are shifted; those intended for specimens are put into pots four inches deep by six across, and those for stock in pots three inches across.

I am principally guided as to what sort of soil I put them in, by judging in what situation they naturally grow: for instance, those that are found in very exposed places I put in a mixture of loam, peat, and sand, thoroughly incorporated with fine broken potsherds; whilst the more delicate sorts, and those which grow in moist, damp situations, are potted in sandy peat, in some instances with a very small addition of loam, and where pure leaf-mould can be had, a small portion is beneficial in both mixtures. After being potted, they are put in some shady situation, or into cradles, over which hoops are placed—so that they can be exposed, shaded, or protected, at pleasure.

On the approach of winter they are plunged, to the rim, in coal ashes, or some other coarse porous material, and protected from severe frosts by suitable coverings. In this state they require very little water during the winter months, and when given, it is very sparingly. On the arrival of spring they are unplunged; if this is not done they are apt to root out of the pot, and when removed, receive a severe check. As the season advances they are shaded from the mid-day sun, and well sprinkled, night and morning, with water—gradually diminishing this, on the approach of winter. The plans generally adopted for their propagation are by seed, which should be sown as soon as ripe; and by division of the plant, which can be done at the potting season.

USES OF THE GARDEN FRAME.

(Continued from page 57.)

FORCING THE CUCUMBER.



THE first step towards the cultivation of the cucumber is the raising of the seedling plants; but as some of our readers are not likely to practise this operation on a very extensive scale, we would recommend them to procure plants from the nearest nurseryman, for it sometimes, and indeed frequently, happens that there are many accidents and disappointments take place before the seedlings can be brought to the advanced state of being fit to "ridge out." It will therefore save much trouble if the plants can be obtained from some source without incurring the trouble and anxiety of raising them. When they are obtained in this way, the cultivators should see that they have been properly "stopped," which means, that as soon as the plants have acquired two well-developed, rough leaves, the leading shoot must be pinched off, while it is just issuing from the axil of the second rough leaf, the object of which is to cause the plant to throw out lateral shoots; for the cucumber, being a climbing plant, would shoot away in one long, straggling stem if this precaution were not taken. If the plants are brought from any distance, and the weather should happen to be cold, great care must be taken that they do not get chilled, and thereby checked in their growth. They must therefore be placed in a close box, which should be wrapped in a flannel covering, and so covered that there is no possibility of the cold air getting at the plant.

It may, however, happen that some of our readers reside in places far removed from any opportunity of procuring plants ready prepared; in such cases, it will be necessary to raise them from seed. The first step then to be taken is to procure some sound and healthy seeds, not less than three years old, if possible, for, within reason, the older they are the better, as the plants are then more productive of fruit, and less so of leaves and vine. Having obtained the seeds, throw them into a basinful of water, and those that are sound will sink to the bottom, while those that are not likely to germinate will float on the surface. The seeds being chosen, let them be sown in a large flower-pot or seed-pan, filled with a compost of sandy loam and vegetable mould, and let them be covered with half-an-inch thick of soil. Now this pot may be placed on the side or end of the hot-bed, on the outside of the frame, having a stratum of ashes under it to prevent the steam from rising, and the whole covered with a hand-glass. In the course of three or four days after the seeds are sown, the plants will begin to appear through the soil, and now the care of the gardener begins. During the middle of the day there should be an admission of fresh air, by tilting the hand-glass a little on one side, and if at this period the weather should prove frosty, a mat or some other covering must be laid over the opening. In giving water to the young plants, care must be had not to water them overhead, as this is very apt to cause them to damp off, but it should be

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allowed to fall on the surface of the soil only, and to be of sufficient quantity as to penetrate to the roots. It is absolutely necessary also that the water should be of the same temperature as the interior of the hand-glass, and for this end a potful should be placed in the bed over-night, so as to be ready for use the following day; and after each watering, the hand-glass should be kept close down for the space of half-an-hour. When the plants have almost divested themselves of their seminal envelope, they should be "pricked out" into pots about four or five inches in diameter at the top; but here again care must also be had that these pots, and the soil with which they are to be filled, should be placed in the frame over-night, in the same way as the water is directed to be done, otherwise, the plants being very tender, if repotted into cold soil they are very likely to be chilled and checked in their growth. In "pricking them out," they should be put three in a pot, in a triangular position, or, as the country people call it, rook-toe-wise. As soon as they have got the two rough leaves, they must be "stopped," as indicated above; and after having thrown out lateral shoots, they will be ready for "ridging out." Now this sowing of the seeds must be begun simultaneously with the first superposition of the frame on the bed, and by the time the bed, that is, the interior of the frame, is sufficiently sweetened and properly earthed, the plants will be ready to be received in their permanent positions.

For the purpose of properly ridging out the plants, they must be turned out of the pots, without disturbing the solid ball of roots, and to do this requires some degree of skill on the part of the uninitiated practitioner. The way this is performed is by the operator placing his right hand flat on the top of the pot, with his fingers so disposed that the plants will be placed between them. The pot must then be inverted, with the mouth downwards, and by slightly tapping its edge on the frame, the plants will fall into the hand with their roots undisturbed, and enveloped in a complete ball of earth. Previous to this, however, a hole should be made in the centre of each hillock, of sufficient size and depth to receive the balls of the plants; in these holes the plants are to be placed, and then the earth drawn all round and over the balls, close up to the neck of the plants. This done, they should be slightly watered with tepid water, as before described, and the lights be kept close for an hour or two; after which they may again be opened a little at the back, to allow the escape of the rising steam. The plants will now begin to branch and grow freely; and as the side-shoots extend themselves, they should be trained regularly, or at equal distances from each other, over the whole bed. If the plants are well managed and healthy, they will, in the course of ten or twelve days after being planted out, produce flowers; and whenever there is the appearance of a fruit being set, the extremity of the shoot should be immediately picked off, one joint above where the fruit is set: this gardeners call "stopping." As the plants extend themselves, the shoots should be pegged down with small hooked sticks, to keep them in their proper places. The chief attention required now will be a judicious supply of water and fresh air. Of the former two or three appli-

cations during a week will be sufficient, and of the latter there must be a constant and free admission daily, even during frost, provided the atmosphere be calm and clear; but when this is the case, the aperture should generally be covered with a mat. The way of giving air is by tilting the lights from half-an-inch to two inches high at the back, which must be regulated by the heat which is contained in the bed. During night the lights must always be covered with mats, and if the heat is strong and the weather should be mild, they may be left tilted about half-an-inch. Whenever the bed shows symptoms of a decrease in the temperature, it must be supplied with linings, and this is done by applying hot dung, fifteen to eighteen inches wide and six or eight inches higher than the bed, to allow for settling, all round the bed; this will increase the heat to its original strength, and whenever it is becoming exhausted these old linings must be removed, and fresh ones applied. The temperature of the cucumber frame should never be below 70° or above 95°.

(To be continued.)

ON THE CULTURE OF THE CAMELLIA.



THE soil best adapted to the growth of Camellias is a mixture of peat, earth, and loam in nearly equal proportions; when the loam is peculiarly light and sandy, a less quantity of peat is requisite.

The earth should be well mixed, and passed through a coarse sieve, reserving the detached portions of peat and loam that will not pass the sieve, to fill the bottom of the pots, thereby securing a free drainage—a circumstance indispensable to the success of the plants. The proper season for the general shifting is when the young growth has hardened, and the blossom-buds for next year can be detected at the extremity of the shoots. After shifting all those that require it, they may be placed in the open air, or retained in the greenhouse, according to the season they are wanted to flower. If kept in the greenhouse, as much air as possible should be admitted, and occasionally sprinkling the foliage will improve the appearance, as well as be beneficial to the health of the plants.

At all times attention must be paid to watering them properly, the roots being apt to become matted in the pots, so as to render the ball of earth impervious to moisture; hence it is necessary to see that the ball of earth is moistened by the water poured upon it, instead of the web of fibres only. This renders an examination of the roots, and reducing or pruning them, at least once a year, a measure almost indispensable. At the respected periods of growth and flowering, the plants will require plentiful watering; during the latter, if not regularly supplied, the bloom-buds will infallibly fall off, instead of expanding into flower; at other times a regular moderate supply is essential. The effect of constantly watering may

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be presumed to diminish or destroy the fertility of the small quantity of earth allotted to each plant; therefore when the annual repotting occurs, carefully take away as much of the former ball of earth as can be done without injuring or cutting the roots. The Camellia may be considered as a hardy greenhouse plant, requiring only a slight protection in severe weather, like the myrtle; and if the plants are kept just above the freezing-point, they will succeed much better than when grown in a higher temperature.

At the time they are making their growth, an increase of heat will be advantageous. The usual methods of propagation are by inarching or grafting and budding on the single red Camellia, cuttings of which are found to strike root more readily than of the double varieties. The cuttings are taken in July and August, or as soon as the young shoots are sufficiently ripe at the base. They are carefully prepared by being cut smoothly over with a sharp knife at a joint, and divested of one or two leaves at the bottom, and then planted firmly about two inches deep in pots filled with the Camellia compost before described, and the upper half with fine white sand. They are then well watered, and the plants plunged in a tan-bed which gives out a gentle warmth, and kept closely shaded for three or four months, by which time short fibres, or a callus from which they afterwards diverge, are produced. When sufficiently rooted to bear removal, they are potted singly in small pots, the sand being then carefully removed; the pots should be well drained, and filled with the Camellia compost, with the addition of a little white sand. They are afterwards to be sprinkled with water, and placed in a close frame or pit until they begin to root afresh, and by degrees exposed to the air. The succeeding season they may be potted in the same soil as the other Camellias and similarly treated, and many of the plants will then have attained sufficient size and strength for inarching or budding, and all of them by the following season.

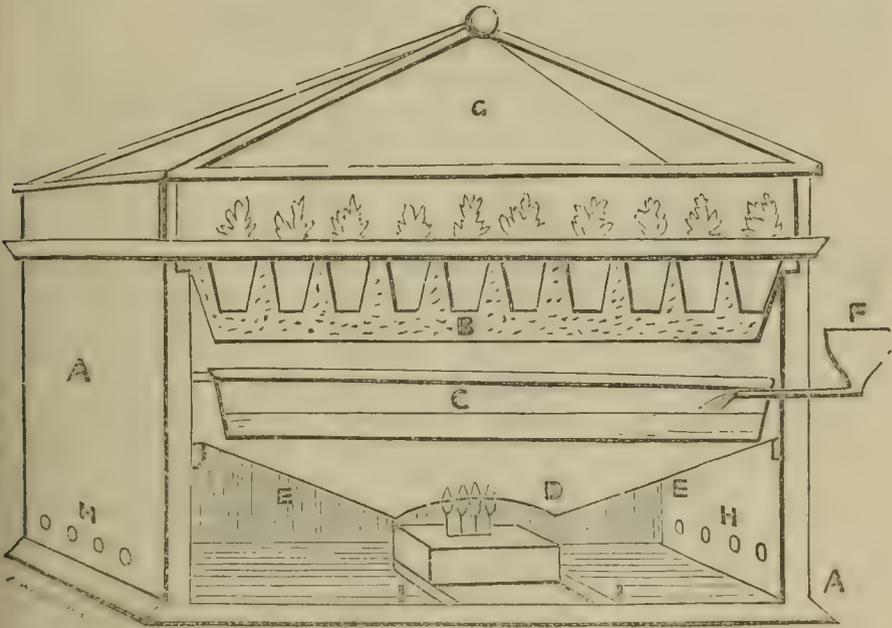
The best time for inarching is early in the spring, just before the plants begin to grow; and for budding, as soon as the new wood is sufficiently ripened, but it may be done at almost any season of the year.

THE COLORADO POTATO BEETLE.—In order to prevent the introduction of the Colorado potato beetle amongst potatoes imported from the United States or Canada, instructions have been issued to the collectors of customs at the various ports of the United Kingdom that custom-house officers are to look out for the beetle on board vessels, wharves, quays, sheds, or packages landed from vessels, and instantly destroy it. To aid them in identifying the beetle a lithographed sketch and description of it have been forwarded. The colour of the insect is yellow, with black spots on the fore part, and ten black stripes, five on each of the wing covers. It is somewhat like a large ladybird, but is rather longer in shape, and is also striped, a peculiarity which is absent in all species of ladybirds.

PROPAGATING CASE.

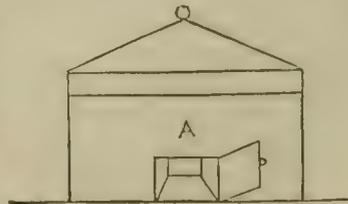


ACCORDING to our promise to a correspondent last month, we now give a design of a propagating case which has been found to answer admirably. The figure represents the case in section. A, is a square wooden box lined with zinc; it is twenty inches square and one foot high. B, is a zinc frame, perforated with small holes. C, a tin or copper pan for water. D, a lamp with four burners, colza oil



PROPAGATING CASE.

being preferred to any other. E, a diaphragm of zinc to confine the heat to the water, the space within D, where the flame of the lamp plays being filled with heated air causes the boiler C to be heated over the whole of its under surface. F, is a funnel for filling the boiler. G, a zinc frame fitted with glass, the whole of which can be lifted off at pleasure. The sides of the box are perforated with holes to admit air for the combustion of the lamp, as shown at H. The lamp is pushed into the centre of the space below by means of the grooves I, and when the case is at work it has the appearance shown in the following small outline engraving, where it is seen that the side of the lamp is closed with a door, which should be of glass, in order that the operator may readily become aware whether or not the lamp is burning properly.

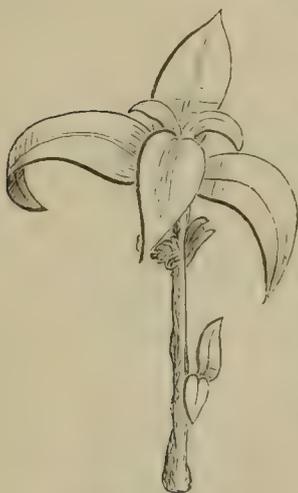


THE MULTIPLICATION OF PLANTS FROM CUTTINGS.

(Extracted from "*The Amateur's Flower Garden.*"*)



BY far the greater proportion of plants that are multiplied by cuttings require artificial heat. Nevertheless, cuttings of many tender plants may be struck in the open ground, or in pots and in frames, without heat, during summer, and in every case the mode of procedure is nearly the same. Very much of what we have to say will be applicable to summer propagation without artificial heat, though our business is more directly with the propagation of plants in spring by means of the heat of a tank or a hot-bed, because that system must



CUTTING OF FUCHSIA.

be resorted to with many bedding plants, and requires more care than propagating in the open ground during summer. We must suppose the heat to be sufficient and constant. If from fermenting material, there should be a large body of it in a nicely-tempered state. There is nothing so good as a tank, for the operator has thus complete command over his work, and can enjoy the comfort of a warm house while attending to his duties. As a rule, a bottom-heat of 60° to 70° will suffice for all kinds of bedding plants that are struck from cuttings. A temperature of 80° to 90° may be used by persons who have had much experience, but 70° should be the maximum for beginners.

Plants to be propagated from in spring should be in a free-growing state, because the best cuttings are those of shoots newly formed, and the worst those from shoots of last year. If therefore the plants are not freely growing, the propagator must wait for them; and to promote free growth, the temperature of the house should be kept at from 60° to 70° , with a moderate amount of atmospheric moisture, and as much light as possible, so that the young shoots will be of a healthy green, and with short joints. Suppose we look over a lot of fuchsias that have been some time in a warm house, we shall find them full of little stubby side-shoots all ready to hand, without demanding any particular skill to remove them. Select one of these plump shoots, of an inch or an inch and a half long, press the thumb against it, and it will snap away "with a heel"—that is, with a thickened base, the separation taking place at the point where it issues out of the old wood. When you have removed it, it will probably have such an appearance as in the subjoined figure. All that this requires for its preparation is to remove the bud which

* "*The Amateur's Flower Garden.*" By Shirley Hibberd. Price 6s. Groombridge and Sons, London.

has just started near the base of the cutting, so as to leave a sufficient length of clear stem to insert the cutting in sand firmly. When so inserted, and kept moist, warm, and shaded, roots will soon be formed at the base; and as soon as the roots have begun to run in search of nourishment, the top of the shoot will begin to grow, which is the sign for potting off. But suppose we have a chrysanthemum instead of a fuchsia. This will have a mass of tender shoots rising from the root, and there is no need to take any of these off with a heel. With a knife,

a pair of scissors, or the thumb-nail, remove a small shoot of not more than three or four inches in length—two inches will be sufficient. This will probably have some such aspect as in the figure. All the preparation this requires is the removal of the lower leaf, to make a sufficient length of clear stem for inserting it in silver-sand. Or suppose we have instead a hard-wooded plant of robust growth, and which is known to be easily rooted, then we may venture to take a still larger cutting. The figure on p. 82 is a side-shoot of *Veronica Lindleyana*; it consists of four joints, is young, the wood not yet hardened,



CUTTING OF CHRYSANTHEMUM.

and needs no preparation at all, because there is a proper length of stem for its insertion. In the case of plants having large fleshy leaves, it may sometimes be needful to crop off half of every leaf except those near the top bud; but, as a rule, as many leaves should be allowed to remain as possible, because the more leaves that can be kept alive while the cutting is making roots, the quicker will it become a plant. No definite rule can be given on this head to guide the inexperienced. It all depends upon how many leaves can be kept alive. If the cuttings are to enjoy a brisk heat, say 70° , with plenty of atmospheric moisture, then nearly all the leaves may be left entire, and especially if the cuttings are in a close propagating frame, or under bell-glasses. But if they are likely to be exposed to draughts, if they are placed in pots or pans in an ordinary greenhouse, and, therefore, subjected to evaporation, the leaves must be reduced in number, and all the larger ones must be cut half away.

Another matter of importance in making cuttings is to determine whether they are to be rooted from a joint or not. Most cultivators

prefer to cut the shoot quite close under a joint, so as to obtain roots from that joint. But there is no occasion to cut to a joint; any plant ordinarily propagated for the garden, will root as quickly from the "internode"—that is, the portion of stem intermediate between two joints—as from the joints themselves. This is of great importance when cuttings are scarce: as a shoot will often furnish half-a-dozen cuttings, if taking them at a joint is of no consequence; and only one or two, perhaps, if taking them at a joint is imperative.



CUTTING OF VERONICA.

The size of the cuttings is a matter of great importance. As a rule, the smaller they are the better. Still, if very soft, many may damp off unless very skilfully handled, so the amateur must secure them moderately firm. Three or four joints will generally suffice for most things, or say nice plump shoots of from one to two inches long. If young side-shoots are scarce, longer shoots may be cut up in lengths of three joints; and if it is a question of raising the largest possible number of plants from the fewest cuttings, then one

joint and its accompanying leaf will suffice. Suppose we have a shoot of a verbena placed in our hands to make the most of it; we shall first cut it into as many lengths as there are joints, leaving each leaf untouched, and to every joint as much stem as can be got by cutting just *over* instead of just *under* the joints. Then with a sharp knife we split each of these joints in half, so as to have one bud and leaf to each split portion, and from every one of these we expect a good plant.

The most convenient way of disposing of the cuttings is to dibble them into shallow pans filled with wet silver-sand, as fast as they are prepared. The best way for those who may have to leave the cuttings in the pans for any time after they have formed roots, is to prepare the pans with crocks for drainage, and over the crocks to spread an inch of chopped moss or peat torn up into small shreds, or cocoa-nut fibre dust, and then fill up to the brim with clean silver-sand. The sand should be quite wet when the cuttings are inserted; and when they have been regularly dibbled in with the aid of a bit of stick, or with the fingers only, it should be placed where there is a bottom-heat of 60° to 70° . A temperature of 80° is allowable when time is an object, but at 60° better plants may be grown; in fact, there is generally too much heat used. From the time of putting the cuttings in heat till they begin to grow, the temperature must be steady, and there must be regular supplies of water. But water given carelessly will surely entail losses. Probably the sand will retain sufficient moisture for eight or ten days, without needing to be wetted beyond what reaches it in the process of dewing the leaves. To dew the leaves neatly and timely is one of the most important matters. For the amateur, to whom a few minutes is no object, the best way is to dip a hard brush in water, then hold the brush beside the cuttings, and draw the hand briskly over it. This causes a fine spray to be deposited on the leaves, to prevent flagging; but if the water is given from the rose of a watering-pot, the cuttings, if small, may be washed out of their places, or may be made too wet.

ON THE CULTIVATION OF THE RASPBERRY.



SOME of the best varieties of this delicious fruit, that is, possessing quality and productiveness, are to be found among the older kinds. The red and yellow Antwerp are still cultivated to a considerable extent, as also a variety called the double bearing, which produces fruit in the autumn as well as the summer, but the Faston or Fibly is the best and most productive of all at present known, the flavour is surpassed by none, in size of fruit it excels; it has also the qualification of giving a second crop in the autumn, therefore where this variety is grown, no other need be encouraged, except for mere fancy of change of colour for the table; then the white or yellow may be called in.

March.

A few years since there were a long contest as to who or what district had a just claim to the merit of introducing this valuable acquisition to the fruit garden, and it is yet a query whether the present name, or names, it bears is correct; as it is not important to the consumer, I will not dispute it here, but there are persons who feel great interest in acquiring the history of all fruits, etc., immediately under their own care, and by those it may be mooted at some future time, my object at present being that of merely giving my practice on the cultivation of this desirable fruit, to commence which I will begin with taking suckers from the old plants to form new plantations. In the first place, it is necessary the stock from which suckers are to be taken should be of healthy and vigorous growth, for if they have been long standing in the same situation, a decline in vigour is likely to take place, and, as the young stuff naturally imbibes the defect, care should be taken to avoid falling in error, which may be followed by disappointment. Suckers may be planted from October to about the middle of February, provided it be done when the ground is not frozen, take them from the old plants by a slight pull, they do not require much exertion; the ground intended for their reception should be dug rather deep, be well manured, and ready to receive the plants. Strong suckers taken with a ball of earth to them may be planted three in a heap, each heap four feet apart in the rows; and if more than one row is planted, the opposite should be at six feet distance. The openings between the rows will not be lost; crops of various kinds can be produced in the spaces in the spring and summer months.

The best mode of pruning to insure a good supply of canes for the following season, which is a consideration well worth notice, is to prune strong canes to three feet, a second two feet, and a third within two or three inches of the surface of the soil; by such management a nice little crop may be taken the first year, and plenty of strong canes left for a main crop. As soon as the canes begin to shoot in the spring, they should be carefully thinned, for if an overstock is allowed to continue they will draw too much nourishment from the old canes, and thus weaken and reduce the quality of the fruit; about the middle of May this must be seen to, four or five being left to each stool, will be all sufficient. Mulch is of great service during the fruiting time, and a liberal supply should always be given, the effect will soon be obvious by the superior healthy appearance of the foliage. As soon as the fruit is gathered the old bearing rod may be cut away, and the young canes be brought a little closer together.

As soon as the leaves have fallen pruning may begin, leaving about four canes of different heights, say about four feet for the highest, nine inches lower for the second, and follow this principle out with the remainder. A top-dressing should now be given, and the canes be neatly tied, leaving them moderately open, so that the sun may act alike on each. A few may be planted against a south wall for an early crop, where they will come very fine.

FEEDING BEES.

WE would remind those of our readers who keep bees, that the season approaches when these useful insects should be attended to. Like all other live stock, they pay best when best fed. During the depth of winter it is unnecessary to feed them; an occasional mild day may entice them abroad, and our own plan being always to thwart nature as little as possible, we allow the exit to remain open for them to take advantage of, a boon which it is evident they may enjoy without risk. If the previous weather have been severe, their food within the hive will not be exhausted, and they will refuse any that may have been prepared for them, and even placed close to their hives. They appear, indeed, to be roused from their torpidity merely to sport in a sunny gleam, for they buzz continually about their homes, are never seen at a distance from them, nor are they found wearied and dying, as in early spring; but as soon as their brief and doubtless *necessary* exposure to the open air is over, they retire to their hives, and quietly settle to another season of sleep or torpor. But as the spring advances, and their stored provisions become lessened in consequence of the bees being more frequently called into activity and requiring food, they ought to be supplied with nourishment every day on which they may venture abroad, until they find flowers sufficient for their subsistence. It is said, but we know not if the assertion may be relied on, that the earliest flowers of spring yield only the substance of which the wax is made. The best food which we know of, excepting honey, and which we have always found to succeed, is thus made:—

A quarter of a pint of water, a quarter of a pint of beer (ale), one pound of moist sugar, and a very little salt, *i.e.*, about half a teaspoonful (bees are fond of salt); boil all together till it becomes a syrup. A small quantity of this is to be poured into a large dinner-plate, which is to be placed near the hives, with a few slender twigs put across it, on which the bees may rest while they eat, to prevent their wings from becoming clogged. Some sticks of elder, about half a foot in length, with the pith extracted, excepting an inch at each end, should also be filled with the mixture, and placed on each stand.

CAPE BULBS.

ALTHOUGH the number of half-hardy Irids of this class, capable of successful cultivation in the open border, is very considerable, they are, with the exception of the *Ixias* and a few others, so rarely seen in gardens of only moderate size, that it is difficult to resist the conviction, that to a large class of amateurs the treasures of this beautiful tribe are comparatively unknown.

March.

As the season for planting most of them is arrived, a few hints on the best species and their treatment may prove useful.

They are usually grown in beds; and this arrangement affords great facilities for protecting them in severe weather, the majority being too tender to endure full exposure during frost. There is little or no danger, however, to be apprehended when the bulbs are not planted till February or March; and in that case, the question of beds or clumps may be left to the taste and convenience of the amateur.

The question of soil is more important; it may, indeed be termed the chief point on which their successful cultivation hinges. They will not do well in poor, sandy soils, which afford them too little nourishment, and stunt their growth; neither will they succeed in the strong, tenacious loams so peculiar to many districts; and even peat, in which they are so often grown, is less desirable than a compost in which it forms but one ingredient. By far the best results are obtained in a mixture of white sand, good fibrous loam, and turfy peat, in about equal proportions. In such a compost, the whole of the Cape Irids will flourish, whether in the open borders or in pots. The ingredients should be well chopped together, and mingled with the hands, but not sifted, as this would remove the fibrous portion, the presence of which is essential to the porosity of the whole. When the peat and white sand cannot be procured, a mixture of decayed leaf-mould and sandy loam may be used as a substitute; but leaf-mould is so generally infested with insects, that it cannot be recommended for this purpose. Any nurseryman will supply a sufficient quantity of all three ingredients for a small sum.

When the bulbs are grown in clumps in a mixed border, the soil should be removed to a depth of from twelve to sixteen inches. At the bottom of the cavity thus formed, three or four inches of broken sherds must be placed as drainage, and the remaining space may then be filled with compost of peat, loam, and sand. The larger bulbs should be planted from four to six inches, and the smaller ones about three inches deep. Single bulbs, especially of the smaller species, produce so little effect, that they should always be planted in patches of at least three bulbs of each kind. In severe weather, and also in very heavy rains, it will be advisable to cover each patch over, even before the leaves appear, with an empty pot.

When grown in a bed, the entire surface may easily be covered with furze, and in the case of bulbs planted in spring, this will afford them all the protection they are likely to require.

As they progress in spring, the only further attention they will need will be an occasional watering in dry weather; and the little trouble entailed in the preparation of a proper compost, will be amply rewarded by the greater vigour of the plants, and the superior character of the flowers.

But that none may be deterred from the culture of these interesting plants, we would add, that in almost any good garden soil, of not too heavy and moist a nature, they will succeed, and even in the case of soils of the most adverse character, a single barrowful of the peat and loam would suffice for ten or twelve good clumps of bulbs.

After flowering, water should be withheld, unless seeds are required, in order that the bulbs may be ripened *early*. This will, in general, be accomplished soon after the foliage is completely withered, but their removal from the ground is a matter to be left entirely to the taste of the cultivator. If allowed to remain, they will vegetate earlier than those removed and preserved in a dry state, and in mild seasons they will flower earlier the following spring; but on the other hand, they will require more attention during the winter to protect them from frost. When sufficient protection can be afforded them—and this is comparatively easy in the case of those planted in clumps—we think that there is some advantage in allowing them to remain undisturbed for two or three years at least, by which time most of them will have increased so much by offsets, as to require division. If they are kept out of the ground during winter, the smallest offsets frequently wither and perish.

We have not room for a list of the best species in each genus, but *Gladioli*, *Watsonias*, and *Antholyzas* are the tallest; most of the others comparatively dwarf.

CULTURE OF THE TREE CARNATION.



FEW plants are more improved of late years, both in habit of growth, variety and richness of colours, than Tree Carnations, and they amply repay the attention that has been bestowed on them, for they are not only beautiful but very fragrant, and with little care they may be had in flower at almost any season; in fact, if a sufficient quantity of plants is prepared, a succession of bloom may be obtained from them the whole year round. I trust therefore, that we shall shortly see them very extensively cultivated. They are easily propagated by cuttings, which should be made of half-ripe wood, like the show varieties, cutting them close off below a joint and removing the lower leaves. March or April will be found the best months for putting in a stock for winter blooming, as they will make excellent plants during summer and autumn. Although they strike readily nearly all the year round if placed in a slight bottom-heat, the most healthy of the old plants should be selected and placed in a warm temperature to excite growth prior to the cuttings being taken off. By following this plan they will be found to strike more freely. The pots should be thoroughly drained for their reception, and a portion of rough siftings or moss placed over the crocks. The compost should consist of one-half light sandy soil and one-half leaf-mould and sand, run through a fine sieve and well mixed together. With this the pots should be filled to within about half an inch of the top, the remainder being made up with sharp sand pressed firmly and slightly watered before the cuttings are inserted.

If placed in a slight bottom-heat they will not require any bell-glasses to cover them, for if only slightly shaded during sunny days they will very speedily take root. All decaying matter should be removed the moment it is perceived, as it creates damp.

March.

As soon as they have become sufficiently rooted, pot them into four-inch pots, still keeping them in a warm atmosphere, and stop them in order to form them into compact bushes.

As soon as they have again filled the pots with roots, give them another liberal shift into seven-inch pots, still keeping them in a warm atmosphere, and using the syringe freely until they have got quite established; when they should be gradually hardened off, and finally placed in a cold frame, where they may remain during the summer months.

Except potting, stopping the shoots, which should only be done when the wood is in a half-ripe state, neatly tying the shoots as they progress, watering when required, frequently overhead, and occasionally stirring the surface-soil, nothing will be needed during the summer and autumn. I have, however, found green-fly troublesome at times, but if the watering-pot is frequently used overhead, but little need be feared either from them or red spider; if they happen to be attacked by mildew, apply sulphur as soon as it is perceived. When cold damp weather sets in, remove them to the greenhouse or conservatory, where they will come into bloom in succession during the whole of the dull winter months. After they have done flowering, select the most healthy cuttings—the old plants should be cut down for another year or thrown away. The stopping should always be regulated by the time when they are wanted to be in blossom—for instance, for early winter flowering the plants should not be stopped after July, and so on; if the plants are well ripened by autumn, they may, by a little additional heat, be had in flower whenever they are required. The soil best suited for their culture is maiden loam, leaf-mould, rotten cow-dung, and silver-sand, to which may be added a portion of mortar rubbish, in order to keep the soil porous; manure-water, with occasional watering of soot-water, will be found beneficial during the growing and blooming season.

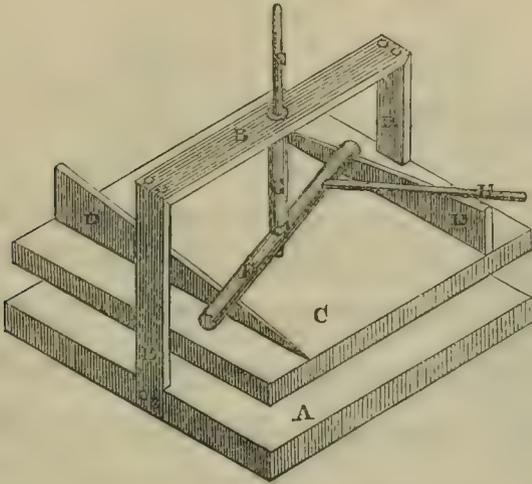
FORMATION AND ARRANGING OF A HERBARIUM.



THE object in forming a herbarium is not merely to preserve dried plants, but to have them so arranged as they may be easily known and determined. In the first place, it will be necessary to provide a quantity of grey paper, and nearly as much of white, of the same size and pretty strong, without which the specimens would rot in the grey paper, the plants or the flowers would lose their colour, by which they are most usually known, and which is most pleasant to behold in the collection.

A press must also be prepared, and a very simple and powerful press may be made by any amateur in carpentry, according to the design here submitted, which has the advantage of not requiring screws, or any of the nicer fittings which an amateur might not be able to produce. It consists of a stout board of beech *A*, to which is fixed a framework *B*. Between these is a travelling platen or top board *C*, on the upper side of which are

fixed two inclined planes D D. The lever F travels on the inclined planes when impelled by the handle H, and can be prevented from slipping back by means of pegs inserted in the top edge of the planes D D. The platen C is kept close to the collar when not under pressure, by means of two pieces of elastic web. You will require some kind of box or collecting case on your rambles, and the



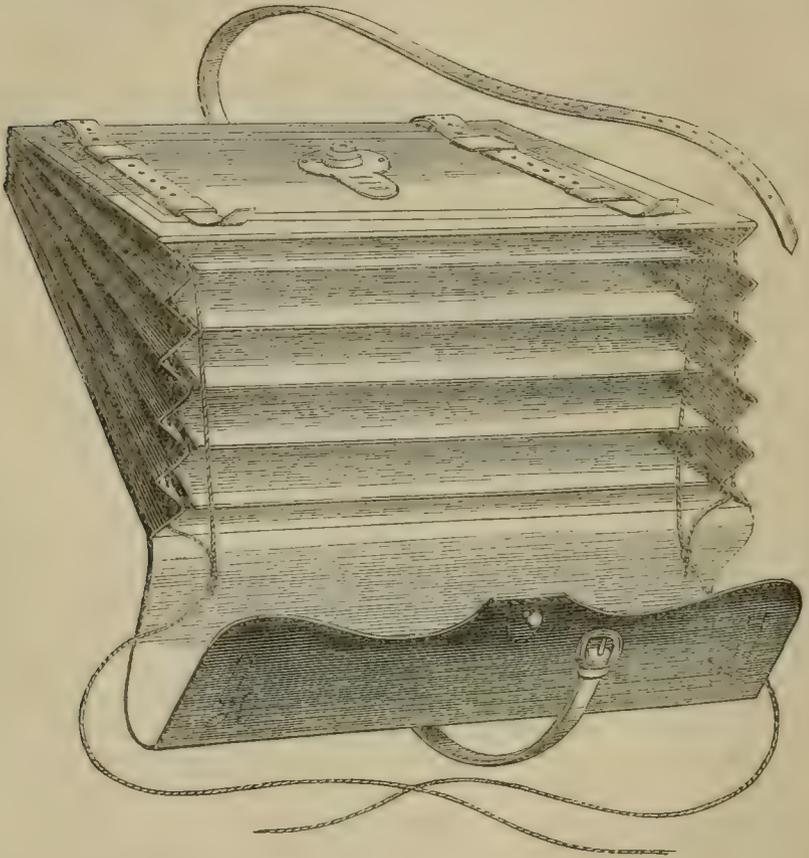
following figure represents a folding case which we have used for many years. It is well adapted to be carried at one's back in the way of a knapsack, and it may be expanded to such a size, both back and front, as to accommodate the spoils of a really great day in collecting. It is the proper thing for any one who goes out botanizing in earnest, for if furnished with blotting-paper, the plants can be laid out properly in the first instance, and the drying process commences at the instant of their being gathered. The one from which our engraving is copied is seventeen inches long by nine inches broad, and will expand to eleven inches.

When these preparations are made, the following rules may be observed in order to prepare the specimens, so as to preserve and know them again. The precise time to gather the specimens is when they are in full flower, or rather when some of the flowers are fallen to give place to the fruit. It is at the time when all the parts of fructification are visible that endeavours must be made to gather and dry the plants. Small plants may be taken whole with their roots, which must be so brushed that no earth remains.

If the earth be wet, it must either be dried in order to be brushed, or else washed off. In this case it should be well wiped and dried before it is put in the papers, without which it would infallibly rot, and injure those near to it. The root need not be preserved unless the plant be small, as the *Salix herbacea*, or unless it have some remarkable singularities.

Nature, which has done so much for elegance and ornament in the form and colour of plants in whatever strikes our sight, has destined the roots entirely to useful functions, being concealed

within the earth. To have given them an agreeable structure would have been to hide a light under a measure. Trees and all great plants can only be had by small specimens, but then the specimens should be well chosen, and such as contain all the constituent parts of the genus and species necessary to know and determine the plant



from whence it is taken. It is not sufficient that all the parts of the fructification are distinguishable, though these would be enough to distinguish the genus; the characters of the foliage and ramification must be sufficiently visible to determine the species of the said genus, which are nearly alike in flower and fruit. If the branches be too thick, they may be made thinner by cutting them nicely with a sharp knife underneath, as much as may be without cutting and mutilating the leaves.

When the leaves and flowers do not come out at the same time, or grow too far distant from each other, take a little branch in flower and another in leaf, and place them close together in the herbarium. You thus have before you different parts of the same plant sufficient to give a complete knowledge of it. As to plants where leaves only are to be found, the flower being past or not yet come, you must patiently wait till they show themselves in order to

be fully acquainted with them, a plant being no more certainly known by its foliage than a man is by his clothes. Such is the choice to be made of what we gather, and we must choose our time when to gather. Plants gathered in the morning or evening, when the dew is on them, or in the daytime, when it is wet, will not keep. We must choose a dry season, and the driest and hottest time of the day; and if the least moisture be found on them, recollect they will certainly not keep.

When they are gathered and brought home, preparations must be made as soon as possible to arrange them in your papers. For this purpose lay down one sheet of grey paper, and upon this half a sheet of white; then place upon it the plant, taking great care that all the leaves and flowers are well opened, and laid out in their natural situation. If it be a little withered, without being too much so, it will generally spread out better with the fingers and thumb; but there are some that are rebellious, and that start up on one side whilst being arranged on the other. To prevent this inconvenience, place leads on those parts which you have put in order whilst you are arranging the rest, so that when you have done your specimen it will be almost covered with these pieces, which keep it in its proper situation. Next place another half-sheet of white paper upon the plant, pressing it with the hand to keep the plant in its position, bringing the left hand that presses gradually forward, and at the same time taking away the leads with the right. Then put another sheet of grey paper upon the second white paper, pressing it all the while lest it lose its position. Upon the grey paper place another of white, and upon this another plant arranged and covered like the former till you have placed the whole harvest, which ought not to be too large at once, lest your task be too laborious; and take care that your papers do not contract too much humidity during the drying, which would infallibly spoil the specimens unless you hasten to change the papers, which must be done from time to time till they are perfectly dry. Your pile of plants and papers thus arranged must be put in the press, without which the specimens will not be flat and even. Some are for pressing them more, others less; but experience will teach what is proper, as well as how often the papers are to be changed, without taking unnecessary pains.

Lastly, when the plants are quite dry, put them into sheets of grey paper, without white ones between, for which there is no occasion, and thus is commenced a herbarium, which will continually increase if there be assiduity on your part, and at length contain a vegetable history of the country.

Specimens of *Ericas*, *Brunias*, and such like delicate-leaved plants, are very apt to lose their leaves in drying, and very often after they are dried. The remedy in this case is to dip the specimen overhead into scalding water, and then to dry them, but not before a fire, proceeding as above.

Specimens of all plants, excepting succulents, may be dried in a few hours, by placing them between hot sand-bags in a moderately-heated oven. Specimens of all succulent and other mucilaginous plants are very difficult to dry on the above methods, owing to the

abundance of sap contained in the stem and leaves; but this may be remedied by observing the following mode, by which we have dried a great quantity of this sort:—Provide some coarse brown paper for the purpose, and after arranging the specimen for drying, cover it with five or six layers of the same sort of paper; then with a well-heated iron proceed to iron the covering paper, till all the moisture is drawn out of the specimen. Sometimes the papers will require changing and the iron reheated before the drying is finished.

It now only remains to speak on the arrangement of the specimens, after they are dried, in the Hortus Siccus, which we shall do as briefly as possible. The herbarium should be a thick volume of the folio size, composed of cartridge paper, well supplied at the back with guards, so that when the volume is filled with specimens the front may not be wider than the back, which would be the case without them. There should also be four clasps on the outside edges, two on the front and one on each end, with different links to keep the volume close while filling and when full. The arranging them in any particular manner must be left to the person's taste. Some arrange them in alphabetical order, some by the natural system, some one way, and some another. We have arranged ours by the Linnæan classification.

If arranged in any of these ways, all the species of one genus must be kept together, and the arrangement should not be commenced till a sufficient quantity is collected; but if promiscuously, they may be fastened down as soon as dried. When the arrangement is fixed on and a sufficient number on hand, proceed to fasten them down with narrow slips of dark-green paper wherever they may require it, and the descriptions should be written in the following manner:—

No. 67.

Capparis Zeylanica,
Stove evergreen shrub,
Ceylon, 1819. White.

Take care always to keep the collection very close and a little pressed, without which the specimens, however dry they may be, will attract the humidity of the air, and again get out of form. It must also be kept in the driest part of the house, and rather on the first than the ground-floor.

AMARYLLIS.—It is better to retain them in the pots, and by turning the latter on their sides, the bulbs may be dried quite as effectually as shaking the roots out of the soil. As soon as the bulbs show signs of returning action, they should be repotted into a rich, loamy soil, made perfectly open and pervious to air and moisture by the addition of sand, and then plunged into a moderate bottom-heat, when the flowers will soon become apparent; when fully expanded the plants may be removed to a cooler place to preserve their beauty, but when the flowers are past, the plants should be taken back to the stove, and encouraged to grow by every possible means, because it is on the vigour of the current year's leaves and their secretions that the bloom for the succeeding years depends.

REVIVING PLANTS.

BY A CORRESPONDENT.



WHEN the leaves of plants have become dry, their buds faded, their bark and roots hard and nearly dry, if not absolutely dead, they may be revived by the following means:—Dissolve camphor to saturation in alcohol, adding the former until it remains solid at the bottom of the latter; a sufficient quantity of rain or river water is then to have the alcoholic solution added to it, in the proportion of four drops to one ounce of water. As the camphor comes in contact with the water it will form a thin solid film, which is to be well beaten up; the camphor will be found to float on the surface for a short time in small flocculi, but will ultimately combine with the water and disappear.

Plants which have been removed from the earth, and suffered from a long journey or otherwise, should be plunged into the camphorated water, so that they may be entirely covered; in two or perhaps three hours the contracted leaves will expand; the young, faded, and dependent shoots will erect themselves, and the dried bark will become smooth and full. That being effected, the plant is to be placed in good earth, copiously watered with rain or river-water, and protected from the powerful action of the sun, until the roots have taken good hold of the ground. When large plants or trees are to be revived, their roots are to be plunged into the camphorated water for three hours, the trunk and even the head of the tree being frequently wetted with the same water, so as to retain them in a perfectly moistened state; but it is always best, if possible, to immerse the whole of the plant. Shoots, sprigs, slips, and roots are to be treated in the same manner.

THE GARDEN GUIDE FOR MARCH.

FLOWER GARDEN.



ANY alterations not yet completed must be finished at once. All climbing and creeping plants should be attended to, properly fixed, and new stakes supplied where required. Plant herbaceous plants, and sow seeds of annuals and perennials. Examine rose trees, and make the stakes safe, and tread firm any that are loose at the roots. The ground between tulips and pansies should be carefully hoed, and the main branches of the pansies should be pegged down and covered with a mixture of fine earth and manure to promote roots. Should the beds and borders require to be dug, they must be very carefully treated to prevent injury to any plants that are pushing through. If Dahlias are not already started, no time should be lost. Pinks, Carnations, and Picotees should have the surface of the ground well stirred, and a top-dressing, as it is a great protection against the easterly winds so prevalent during March. Calceolarias should have a shift into large pots, allowing plenty of drainage, and giving the plants a gentle watering with a fine rose, keeping them close for about a week and shading from the mid-day sun. The already rooted stock of soft-wooded plants should be potted off, and be placed in a heat of about 55°, so that they may become well established before hardening off. Cuttings

March.

may be taken from the early plants in many cases to their advantage, as it may tend to keep them bushy. Balsams for bedding out may be sown in heat, but they will not require such high culture as those intended for bloom in pots, as sturdy plants only are required. A top-dressing of half-rotten cow-dung will be beneficial to *Liliums*, and do not expose the pots to the hot sun.

KITCHEN GARDEN.

This is a busy month in the kitchen garden, and great exertion will be necessary to do the necessary work, and it will not do to let things get in arrear. Sow asparagus in drills in high rich soil and make up new beds if required. Ash-leaved kidney potatoes may be planted under a full south wall about the middle of the month. Plant various kinds of peas for succession crops and protect those that are up with dry ashes. Plant broad beans at the beginning of the month. Sow Horn carrots on a warm border. Sow various kinds of cabbage during the month, and transplant autumn-sown cabbages and cauliflowers. Sow broccoli for autumn use and also lettuces of various kinds. Sow onions for the principal crop about the middle of the month, giving the ground a good dressing of well decomposed manure before sowing. Celery plants sown last month should be pricked out into frames as soon as they are fit, keeping them close until they are established, then gradually expose them to the full benefit of the atmosphere. Sow another box or two at the beginning of the month, and for the general crop about the end of the month. Raise capsicums and tomatoes in a slight heat, and prick them out as soon as they touch each other so that they may be strong to turn out at the proper time. Make new plantations of thyme, sage, mint, and other perennial herbs. Sow radishes and small salads once a week for succession crops. Sow spinach between the rows of peas, and a few early Dutch turnips may be sown; they will be found serviceable if they should not run. Fresh beds of rhubarb should be made to ensure a good stock for early forcing as well as summer use. Protect mushroom beds from frost, and make new ones in some sheltered situation for a summer and winter supply. Cucumbers and vegetable marrows to be sown in frames, and when up be careful not to check the plants by using cold water, and close the frames early in the afternoon. Sea-kale roots may be planted in a well-trenched, rich deep soil.

FRUIT GARDEN.

Protecting material for wall fruits should be provided at once, if not already done, but let the trees have all the sunshine possible, as that is beneficial—it is the frost that does the mischief. Should any pruning or nailing have been neglected, see to it at once. Grafting may be commenced, and be careful to clay and moss the insertions securely as a protection against the cold drying winds. Such trees as are affected with the American bug should be washed over with lime water. It should be applied to every part of the tree while hot, taking care that the mixture is well stirred before using it. Make a final pruning of apples, plums, and cherries, and endeavour to complete the pruning in the first week, and the red and white currants during the second; in pruning them, thin out the branches, and keep the middle open, that the sun and air may act on the fruit, which will improve the size and flavour. Raspberries should be attended to, by cutting out the dead canes and thinning those of last year where too numerous, and shortening those left for fruiting. Should new plantations of raspberries be required, they may be made with the young shoots of last year's growth. Strawberry plants in pots now taken in will ripen fruit in May. Place them near the glass and give water to them when required, taking care the plants do not get dry.

GREENHOUSE AND CONSERVATORY.

Plants in the greenhouse are now in active growth and will require more than usual care. Look out for green-fly and other enemies, which if not now kept in check may do irreparable mischief. See that there is water in the house, to warm and soften for next day's use. Take care in watering that you do not give a chill, and watering and ventilation must be regulated by the weather. Fuchsias, acacias, and other plants that are growing freely, may be syringed. The propaga-

tion of plants should now be commenced, either by buds, cuttings, layers, or division of plants. Carefully examine all the plants, as many will require repotting. Dahlias at work will require to be potted. Hydrangeas may be increased by cuttings, which should be the tops of any shoots that have very plump leading bulbs about one inch below the bud of each cutting. They should be inserted each in a small pot, and placed in a moist heat, when they will soon strike, and with proper management form one fine head, each strikingly beautiful. Camellias done blooming should be immediately repotted, for if allowed to push the least before this is done, the operation frequently kills the tender shoots. Bedding plants should be kept warm and have little air. When the bright weather comes they may be more freely ventilated, to harden the wood and check their growth. Geraniums that have been kept in pits, windows, and cool houses, in a rather dry state, now require pruning and a little water.

STOVE.

As the sun now will be having some effect, the temperature may be increased to about 60° at night, to 70° or 75° during the day. Every opportunity should be taken to give air in abundance, but take care of cold draughts. An increase of water must be given as the plants increase in growth, but do not supply it to excess. To those plants making rapid growth some stimulus may be given in the shape of liquid manure, but take care that it is not too strong. The atmosphere of the house should be kept humid, by syringing the plants and sprinkling the paths with tepid water. Look well after insects, and destroy them upon their first appearance.

PITS AND FRAMES.

Auriculas will now be growing, and should have frequent supplies of water and abundance of air when there is no frost. All secondary trusses should be removed, and the pips in the trusses left should be thinned to eight in number, taking care to remove those that are ill placed. Melons will require considerable attention to set the blooms, and to train the vines and check superabundant growth. Cucumbers must also be regulated very carefully, giving but little water during dull weather, and the laterals stopped above the second joint. Thin the crop in time if fine fruit are required, but where produce is more important than size and beauty, they may be allowed to bear all that set, and they will be sooner over for succession plants. A brisker heat may now be encouraged by the use of fresh linings; but with the increase of heat vermin will abound if not looked well after, and fumigation immediately effected.

TO CORRESPONDENTS.

PYRUS JAPONICA.—*W. J. Clapham*.—This is increased by layers. It may also be worked on thorn stocks. The layers are put down in September in the usual way, and are allowed to remain till the September following, when they are taken off and planted in nursery rows until strong enough to be removed to the places they are intended to decorate. It will grow in any good loamy soil or clay, and makes a very beautiful bush or standard. But the best situation for it is a dwarf wall.

P. Wood, Essex.—You will find the information you seek in Mr. Hibberd's book, "The Amateur's Greenhouse," price 6s.; any bookseller will procure it for you.

ROSES.—*M. Meredith*.—Your roses have been attacked by mining caterpillars. It is impossible to do anything now to prevent an attack in the forthcoming season. But by constant watching you may be able to arrest the progress of the enemy when he next makes his appearance, and there is no other way but to catch and kill.

ORANGE TREES.—*E. Gough*.—You may repot the orange trees now, using strong turfy loam with about a fourth part of fat manure. The orange requires liberal cultivation, and there is not the least occasion for grafting trees raised

March.

from seed, as they are sure to fruit when old enough, if they are treated liberally.

AZALEAS LOSING LEAVES.—*G. W., Sunderland.*—We presume that your azaleas are of the hardy kinds; and if so, there is nothing unusual in their shedding their leaves in the autumn, as they are deciduous plants.

SLUGS.—*J. W. Hedon.*—We can only advise you to be vigilant in trapping, and if you persevere you may get rid of every slug in one season. Put little heaps of brewers' grains about near their haunts, and examine these every morning and destroy every one you find. Or lay cabbage-leaves under tiles, and every morning take them up and make away with the spoil.

GREENHOUSE CONSTRUCTION.—*S. F., Stafford.*—We think you will find all the information you require in Mr. Hibberd's book, "The Amateur's Greenhouse." We think the diagrams and description in the book are so plain that any one at all used to tools would have no difficulty in constructing one himself. We do not know of any objection to Belgian glass for the purpose you name.

AUCUBAS.—*C. H. F.*—Your post-card reached us after the February number was printed. We should not advise transplanting now, as possibly chilling east winds and frost succeeding to the considerable period of wet that we have had, may affect the plants before they become established in their new site.

ASPARGUS.—*H. R., Brixton.*—We ourselves prefer to raise our own asparagus plants rather than trust to bought ones, but as you have neglected to sow seed, it appears to us that you are compelled to trust to the nurserymen, but of these we do not think it fair to recommend one more than another. We will bear your suggestion as to ferns in mind, but must wait for an opportunity.

PASSIFLORA.—*B. S.*—Thin out the young wood, and lay in the last year's wood where there is room.

AURICULAS.—*J. H., Leeds.*—The growers know how to pack the plants in pots, so as to reach you safely, without being disturbed in the present state. Auricula seed does not require forcing, it will come better by slow natural treatment; keep the surface moist, the seed will not harm by frost.

CENTAUREA CANDIDISSIMA.—*S. M. M.*—The small shoots from the bottom of the plant will readily strike in sand under a bell-glass, but there are generally a number of suckers which are perhaps better. Should your plant not be furnished with these, encourage it to make side-shoots by nipping the top out, and set it in as warm a place as you can, and you will soon have a crop of cuttings that will make nice plants by bedding-out time. Plants from seed come true with very slight variation, but the normal type will be more uniformly preserved by means of cuttings.

BANKSIAS.—*Polly.*—Your aspect is not at all suited to banksias; they require even in the best climates a south wall.

FUCHSIAS NOT BLOOMING.—*Amateur.*—Look to the drainage of the pots. Fuchsias often refuse to open when the pots are badly drained. Perhaps the soil is too poor, or do they suffer from drought?

SHADY BORDER.—*Pupil.*—There are many good things that may be grown in your shady border. All the members of the genera *Aconitum*, *Delphinium*, and *Helianthus* will thrive in it. If the soil is good, the common Christmas rose will do well. Hollyhocks will do, but you must not have expensive kinds. *Papaver bracteatum* and *armeniacum* will be quite at home there, and all the *Phloxes* are available if the situation is airy. Plant plenty of polyanthus and primroses. Double daisies will do if taken up and replanted every September. A fine display may be made in autumn by turning out a number of fuchsias. Lastly, British ferns will enjoy the shade, and you may, if you like, appropriate the whole border to them.

WINDOW GARDENING.

BY JOHN E. MOLLISON.

(Continued from page 71.)

FILLING WINDOW BOXES.



TN planting window boxes you can have a wonderful variety in plants and general arrangement, and there is great scope for a display of neatness and taste. The box itself may be scalloped, beaded, carved, or plain; painted, varnished, and decorated in any style; made of wood, slate, tile, or virgin cork, or other materials. And as every season comes round you can have your window box striking the yearly quarters as true as any calendar, as one season's flowers die out and another come in, keeping up the interest all the year round, and forming a never-failing source of pleasure.

In this chapter I propose to fill an imaginary dozen or so of boxes to give you an idea how it may be done.

I will take them as they bloom in their seasons, from the early tulips and snowdrops of spring to the chrysanthemum and variegated shrubs and holly berries of winter.

Box 1.—Early Duc-van-Thol tulips, and two or three roots of Golden Feather in the centre. Snowdrops, yellow, white, and blue crocus round the outside.

Box 2.—Early Duc-van-Thol tulips, early hyacinths, arabis and aubrietia inside; with mixed crocuses outside and clump of double snowdrops at each end.

Box 3.—Late tulips, hyacinths, and crocuses, double and single primroses and polyanthus inside; sweet violets and hepaticas round the outside.

Box 4.—Dwarf wallflower, Brompton stocks, polyanthus and narcissus inside. Red and white daisies, blue and yellow pansies round the outside.

Box 5.—Dwarf wallflower, Brompton stocks, and lily of the valley. Red and white daisies and blue pansies round the outside.

Box 6.—Variegated and scarlet geraniums, brown and yellow calceolarias; with blue and white violas and pansies and echeverias round. Sow sweet peas at each end to train up.

Box 7.—Geraniums and pelargoniums, with little patches of annuals between, such as candytuft, nemophila, clarkia, and mignonette; with blue lobelia, sedums, and echeverias round. Canary creeper, nasturtium, and sweet peas, to train up the window.

Box 8.—Scarlet and white geraniums, brown and yellow calceolarias alternately; blue and white lobelia round; with canary creeper and nasturtium at each end.

Box 9.—Geraniums, calceolarias, and fuchsias, with musk plant and lobelia round; a few Virginian stocks between; and scarlet-runners to train up at each end.

Box 10.—Scarlet geraniums, with lobelia; blue and yellow violas

and white pansies round; canary creeper trained as an arch over from end to end. Scarlet nasturtiums trained up the window.

Box 11.—Geraniums, heliotropes, calceolarias, and fuchsias; mignonette, musk, lobelia, and echeverias round; sweet peas and convolvulus trained up the window.

Box 12.—Stocks, asters, and geraniums; with lobelia and mignonette round.

Box 13.—Stocks, asters, chrysanthemums and mignonette; with echeverias and blue and yellow violas round.

Box 14.—Green and variegated twigs of shrubs, such as ivy, hollies with berries, aucuba, laurels, box, etc., with cut chrysanthemums in vials of water intermixed, to be renewed as they fade during winter.

I have thus filled a few imaginary window boxes arranged according to the flowering season of each class of plants. The examples I have given will help you in your selection of plants, and give you an idea how to arrange them tastefully and to the best advantage. Of course, circumstances must rule your selection of plants to a great extent. Every one cannot afford to keep up such a selection of plants as I have enumerated. Still it is wonderful what you could purchase for a few shillings in Covent Garden Market, during the season. And by replacing faded and out-blown flowers with fresh plants now and then, and adding fresh soil occasionally, one box can hold all or nearly all the passing seasons display. Directly your autumn flowers are out of bloom you should refill your box with fresh soil, and plant your spring flowering bulbs, such as tulips, hyacinths, crocuses, snowdrops, etc. October and the first half of November is the best time for planting them, and two inches below the surface is the proper depth. Mice are very fond of these bulbs, so you must take care that they do not get at them. The best way to do this is to cover the box with something. Bulbs spring best in the dark, so you should keep the box in a closet or anywhere from the light till they have sprung up about an inch or so. After planting give them a moderately good watering.

You can have very pretty flower-boxes by filling them entirely with annuals, such as red and white candytuft, clarkia, nemophila, larkspur, musk, mignonette, Virginian stocks, and many others. They make a gorgeous display of bloom for a few weeks. Mignonette especially is a favourite with every one, for its delicate little flowers and exquisite fragrance—really “a little darling,” true to its name. A box of annuals should be sown about the end of February, in small patches or lines, as you may wish them arranged. Flower seeds vary much in size, from the big scarlet runner to the very small clarkia, and you must cover them accordingly. Scarlet runners, nasturtiums, and sweet peas may be covered half-an-inch; clarkia and mignonette hardly covered. When the seedlings are up you will have to thin them out as they grow; thin them out well, leaving only four or five plants in each patch. If left too thick you will have poor bloom and a wilderness of weak plants; while if properly thinned, you will have nice strong plants and a fine display of flowers. Annual boxes soon get weedy looking, and to make them

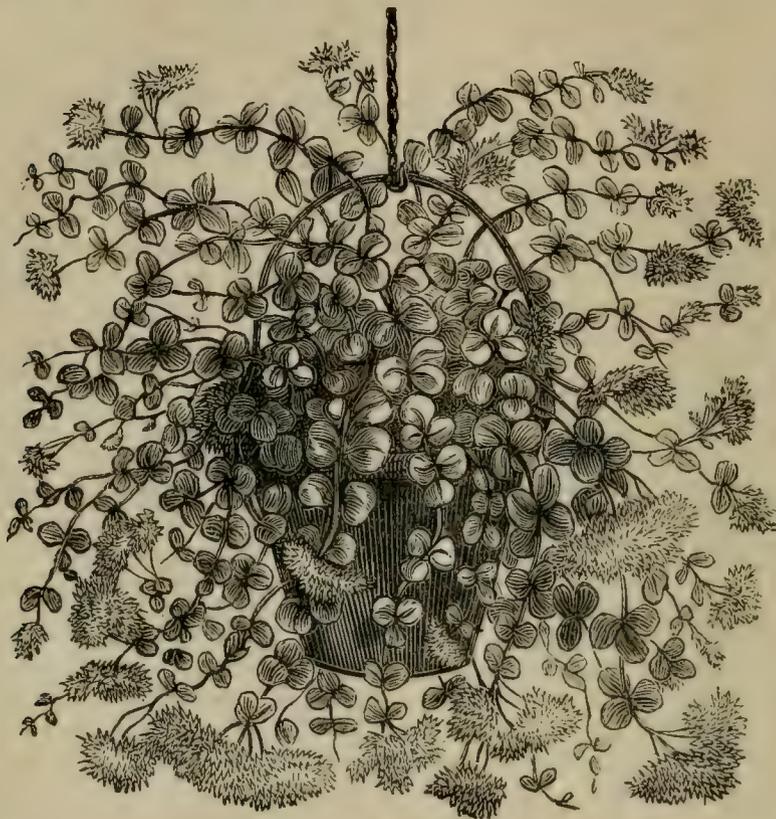
last as long as possible in flower requires a good deal of attention in picking out fading plants and dead flowers.

As the spring advances and risk from frost becomes less, your window boxes will begin to receive their summer occupants; then what a wonderful display you may have. The gay golden canary creeper, nasturtiums, scarlet runners, etc., will convert your windows into a veritable garden bower, while your boxes blaze like a jewelled coronet. Creeping plants can be trained all round the window by having small twine led round for them to cling to. A few small nails in the crevices of the stones and the twine twisted round them will do this. Your boxes will require regular attention with water in the summer time, but you should not water your box overhead, as watering thus spoils the bloom. When the plants are dirty you will have to sponge the dust off leaf by leaf. Take care to have all dead leaves and blooms cleaned away and nothing left to cause any unsightliness. Thin and prune to keep the plants from overcrowding too much. What beautiful specimens of window boxes one sees in unexpected places sometimes. I happened on several occasions to be in a small manufacturing town some time ago, and nothing gave me so much pleasure as a box of flowers in one of the windows of a large factory; it was so tastefully arranged and so gay that I could not but admire it. As far as I recollect now it was a green painted box filled with scarlet and white geraniums and yellow calceolarias mixed, bordered with musk plant and lobelias. What gave the crowning effect, however, was an arch thrown over from end to end of the box and a canary creeper wreathed round it. I used to think it like some gigantic golden crown sparkling with gems. Whoever arranged it had good taste.

Now, supposing you have got your window box in beautiful array, and the graceful creepers twining bower-like around the window, what would be prettier than a neat wire basket hanging from the centre, with a creeper twining round the wire-work, and hanging down in little festoons of flower and foliage; a bright scarlet geranium, and a plant or two of blue lobelia filling it up within? Such a window would create quite a sensation in the neighbourhood. A strong hook for the basket to hang from, driven in above the lintel, would hold it up. To prevent the wind from blowing it against the window, it need not hang far down, or, better still, a wire may be stretched across from side to side of the window to fasten the basket to, and hold it steady. And to go a little farther still—if you live in a cottage, or on the ground flat of a house—why should you not have a tasteful little rockery built up to your window-sill, so that your window-box may act as the crowning point of it? Thus you could have ferns, mosses, rock and Alpine plants growing in conjunction with your window display, the whole forming a combination of flower and foliage that would be the admiration of every one who had the pleasure of seeing it, and reflecting at the same time no small amount of credit on yourself.

You will find the window boxes always one of the richest treats in London. Some of the houses at the West End are veritable

gardens, every window being full of lovely flowers. There you can study the tasteful arranging of a window box in the highest style of



SEDUM SIEBOLDI.

the art. No lover of flowers can pass through such streets without being pleased and delighted, or leave them without bringing away a serviceable hint stored up for future use.

ON THE GENERAL CARE OF PLANTS AND THE WINDOW GREENHOUSE.

Let us consider, now, dear readers, what we can do to keep our window plants clean and healthy. We all know that dirt and untidiness with us is much against our bodily health, and often the origin of disease. It is the same with plants. Unless we can keep our plants free from dirt and insects, and allow them plenty of fresh air and sunshine, we cannot hope to be very successful in growing good specimens. In the course of our daily duties, dust, less or more, settles on our window plants, till by-and-by they get quite grim and grey. You will understand how hurtful this is when I tell you that the leaves of a plant are its lungs. The leaves and stalks of a plant are perforated with innumerable small pores in much the same way as the human skin. Through those small pores they inhale the fresh air so necessary to their existence, and exhale the oxygen so necessary to our life; and through them they absorb

moisture from the air around them, and give out the excess of moisture to the air again. You would hardly believe what a great amount of moisture a plant gives out in a day: some plants giving out more than their own weight. You will understand, then, how necessary it is to keep your plants clean, so that the pores in their foliage may not be stopped up and impeded in their action. Wash your plants, therefore, every now and then, and whenever there is a warm shower during summer, turn them outside, and let them have the benefit of it. They delight in a summer shower. It does one's heart good to see how thankfully they bathe in the welcome rain-drops, coming back when the shower is over with their faces perfectly shining.

When you wash your plants, use tepid water, with a little soap dissolved in it, and a bit of sponge or flannel. The operation requires to be gently done, especially with ferns. Keep the stalk of the leaf between your fingers, and the leaf lying on the palm of your hand, washing outwards to the point. Don't rub the leaf, but just draw the sponge gently over it leaf by leaf. Water overhead with a rose, after you have finished, to wash off any soap or dirt left. Do not water overhead if the plant is in bloom, but just contrive to water the foliage only. Always choose a dull day, or the morning or evening, to wash your plants. A warm sun is so apt to blister the foliage, if dripping wet when the sun shines on them.

Light and air are absolutely necessary for the health and well-being of your plants. You may as well expect a prisoner, shut up in a cell, to grow fat and rosy, as expect a plant to thrive in a dark corner, where it never gets the warm sunshine or breathes the free air of heaven. As soon as daylight comes in, place your plants as close to the window as you can manage without crushing them. Expose them freely to the light, shading only when the sun is very warm. Geraniums, for instance, never need any shade. Cinerarias, calceolarias, and some other soft-wooded plants, require shading from a very warm sun. Ferns and mosses again always succeed best if so placed that the sun never reaches them, but still near enough to the light. A window that the sun does not shine on suits them to a nicety. When plants are kept at a distance from the light, they get weak and sickly, throwing out lean, unhealthy branches, and turning their leaves all one way, as if supplicating the approach of the light they cannot do without. And if at the same time they are denied a breath of fresh air, they lead a wretched existence, and ultimately die of sheer neglect. I do not believe any of my readers would allow their pretty plants to come to such an untimely end. No, no; give the poor plants what is so necessary to their existence—plenty of light and air, sunshine, and shower. Keep them clean and tidy, and they will show their gratitude in many ways; and never forget to turn your plants round every two or three days, or else they will be sure to grow one-sided. Give them plenty of air, by opening the window every day when not too cold. Open the window from the top, never from the bottom, which causes a cold draught. They do not like a cold draught any more than we do ourselves. On fine days, during a warm shower, place them outside.

It will do them great good, and give them robust constitutions, and enable them to stand any extremes they may be exposed to; just as when we ourselves take plenty of open-air exercise, we are not so liable to catch colds in windy and cold weather as those who keep indoors afraid for a breath of air to blow upon them.

In the management of the miniature greenhouse we constructed in a former chapter, airing is one of the principal things connected with it. Do not be afraid of giving it air during fine weather—during the summer especially. Before the morning sun is much on it, you should give it a sprinkling with water at about 65 or 70 degrees of heat, all round the inside and over the plants, with a small syringe or fine rose. This refreshes the plants and raises a soft moist atmosphere in which they delight. This you will clearly understand if you have noticed how refreshed everything in nature looks after a summer shower, and how robustly everything grows in showery summer weather. As I told you before, the leaves and stalks of plants have innumerable little pores all over their surface, through which they inhale moisture from the air around. Now this damping of your little greenhouse is like giving the plants a pleasant draught which they drink up greedily. Of course this is summer treatment; during spring and autumn it is seldom necessary, as the days are so much cooler.

About half an hour or more after syringing, open the top airing an inch or so; an hour after that, open it half up, and by ten or eleven o'clock you will be able to lift it up full, and if the day is very sunny draw down your blind then. At midday open the front airing for two hours or so. Front airing, however, need not be given in dull days, and never during spring or autumn, but when the sun is very hot. The front airing should be taken off about two o'clock, or as soon as the full glare of the sun is past. When the sun is slanting from the west draw up the blind and reduce the top airing half; then, a little before sunset, shut it off, except half an inch to allow the exit of steam which will arise, for you have now to water your plants if they are dry, and then syringe again as you did in the morning. The half inch of air may be taken off at bed-time. During very warm summer weather, it is better left on all night to keep the plants cool. This is the proper treatment to give your little greenhouse. I wish you to consider what I have said about it earnestly. I have told you in as plain words as I can, and I hope you will follow the directions I have given. Read them over often till you have a clear idea what to do, and there is no fear of your being unsuccessful in its management. You will notice I have not said anything about winter treatment for your greenhouse. This is hardly necessary, for, unless you can heat it, the plants must be all brought inside the window at the approach of winter. Here I will tell you a very simple contrivance by which you can have your plants in your greenhouse for a considerable part of winter, when no severe frost is in the air. If the night is frosty or cold, fill a stone jar—what is commonly called a greybeard will do—full of hot water, and place it inside your greenhouse after sunset. Have another hot one to replace the cold one at bed-time. This warms the greenhouse

nicely, and keeps out a moderately keen frost, if at the same time you have a bit of old carpet or such like material to put on the roof outside. This is a very simple way of heating by hot water; and, in fact, you would benefit your plants a good deal by doing this on any very cold night during the fall of the season and the early spring. If you wrap the greybeard in two or three folds of flannel or any old woollen stuff the heat will be economized and last some time longer.

I had intended to say a few words this month about insects and their prevention and cure, but must defer them until next.

(To be continued.)

CULTURE OF THE CALCEOLARIA.



THE culture of the Calceolaria is a very simple matter, and those who wish to begin at the beginning, and obtain early blooms should commence by procuring seed, and sowing it in the last week in August in a mixture composed of equal proportions of light sandy loam, well decomposed leaf-mould, and silver sand; mix it well together, and have ready some six-inch pots, well drained with potsherds, say about three inches deep. Upon the top of the crocks place a little layer of moss, which will prevent the mould running through amongst the potsherds. Now take a sieve with a mesh a quarter of an inch wide, sift your mould through this, and put all the coarse that is retained in the sieve into your seed-pots upon the layers of moss, and fill up your pots to within one inch of the top, upon this place the fine mould that has run through your sieve, filling the pots to within a quarter of an inch of the tops; this is to allow sufficient room for watering, as frequently, by filling the pot too full, the first application of water washes all the seed over the side of the pot, which is consequently lost. When the pot is thus filled, press the soil to an even surface; this done, sow your seed regularly all over the pot. The next thing to be done is to cover the seeds, which is the most essential thing to be attended to. For this purpose you should have a very fine hair sieve, and put into it a very small portion of your sifted mould, which lightly shake over the seed until you have barely covered it. It is better for the seed to lay upon the top of the mould than be covered too deep, for that is the cause of so many seeds failing to vegetate; when the seed is finished sowing, the pots should be removed to a dry airy shelf, and be constantly supplied with water, never by any chance allowing the top of the mould to become dry; for this purpose a very fine rose water-pot should be used, and the water made a little tepid, either by setting some in a sunny situation in the house, or by adding a little quantity of warm water to the cold. By attending carefully to the watering, the seed will soon begin to germinate, and in seven or eight weeks the plants will be in a proper state to prick out. For this purpose use the

same kind of compost that the seed was sown in, and the same sized pots. Prick out in each pot from thirty to forty plants, and return them to their former quarters, where they may continue to have the full benefit of sunlight and air. When the plants have grown to a size that they begin to touch each other, they should be potted off into small sixty-size pots, using the same compost as before, and placing the plants on a shelf near the glass; as they progress in growth, they must be shifted into larger pots, adding to the compost a small portion more of loam, and if at hand, a little well-decomposed cow-dung, this will invigorate them amazingly, and the loam will make the compost more holding. As the season advances, and they increase in size, they must be again shifted into larger pots in which they will bloom. When in bloom, they should be kept shaded from the hot rays of the sun, as they will bear but little at this season, their leaves being so very large and fleshy that the sun soon affects them and proves injurious. One thing must more especially be attended to; in all stages of their growth be sure to look minutely after greenfly, as there is no plant so subject to its attacks as the *Calceolaria*, and if allowed their full range, the pest will be sure to injure the plants, even if it does not kill them. Never allow these pests to establish themselves, but fumigate upon their first appearance, which is generally upon the under side of the leaves. When the plants have done blooming is the time that the plants require the greatest care, and instead of setting them in any corner or out-of-the-way place, when they are no longer attractive, as is generally the case, to be attacked by all manner of insects or exposed to heavy rains or the scorching effects of the full sun, they should be treated in the following manner. Cut out all the blooming shoots, and clear away all decayed leaves, then prepare a box in some shady situation, raise the box upon pots or bricks, and put some cinder-ashes at the bottom to keep the worms from troubling them; upon the ashes put your plants, and by raising the box as before stated, air will circulate freely beneath, among both pots and plants; the lights should also be lifted a little, which will increase the circulation and keep the plants healthy and vigorous. When they have made some growth, get a little heavy compost such as you have prepared for the purpose, and top-dress them with it; this will increase their vigour and cause them to strike root freely into the fresh soil; but when this is perceptible, do not be tempted to take cuttings or part the roots, but allow them to remain in quietude until the last week in September or the first in October, when you may safely venture to propagate them. At this season, when the sun has lost some of its power, and the nights are more humid, you will find the cuttings strike root in a few days. On parting the plants, remove all the old mould, prune the roots, and put them into small pots, sinking them rather deep in the pot, and place them in a close, cold frame. When the sun is bright, shade for a few days. If more plants are required than you can make by parting the roots, take off cuttings; use the same compost with a little more sand added than before, place the cuttings singly in pots, either sixties or thumbs, according to the size of the cuttings, and place them in a cold frame; keep it close for

several days, and shade when the sun is powerful. Look closely after them, and remove all decayed leaves; by attending to this you will keep your cuttings from damping (or what is more generally known by the term *fogging off*), and in about a month you will find the greater part of them sufficiently rooted to require shifting into larger pots. By following the same instructions as previously given, and treating your plants when striking root precisely the same as your seedlings the season preceding, you will meet with success that will be gratifying as well as satisfactory and pleasing to yourself, and you will not meet with the annoyance and disappointment year after year that so many lovers of these beautiful flowers complain of. The chief cause of failure in growing *Calceolarias* is the generally improper treatment they are subjected to after the blooming season; after nearly exhausting themselves by the profusion of bloom, instead of being neglected, they should be diligently attended to; and if put away in any out-of-the-way corner, exposed to the sun's rays and heavy rains, allowing them to become infested at the same time with insects, only failure must be expected. It should be remembered that the *Calceolarias* will not bear to be disturbed during the summer months, even if they are in the most perfect health; if you disturb their roots during this season, you will probably lose them all, so do not be impatient with your plants, but allow the hot season to pass away before disturbing them. Their summer treatment is not attended with any great trouble, it being merely necessary to keep them clean and quiet from the month of July to the end of September when you can recommence to propagate.

SUMMER CLIMBERS.

BEAUTIFUL as are many of the half-hardy exotics employed as summer ornaments of the open garden, they yield the palm to the more luxuriant class of plants popularly known as summer climbers, without a due proportion of which, no garden, however perfect in other respects may be its arrangement, can be said to be complete.

By the feminine elegance of their growth, they lend an air of freedom, which is sought for in vain in plants of a more restricted habit; and impart a charm to localities and objects the most formal in their character. In no one point do the resources of modern gardeners present a more striking contrast to those of the florists of the past generation, than in the case of climbing plants; for, whilst they were restricted to one or two annual species, the number of these now available is, happily, so much increased, not only by recent introduction, but also by the now ascertained hardiness of plants hitherto regarded as too tender for the open air, that selections may be made suitable to gardens of any extent. Dividing this class of plants, for convenience of treatment, into two groups,—*the annuals* and *the perennials*—we will notice, first, the most robust individuals composing it—the perennials.

At the top of the list we must, undoubtedly, place the *Mandevilla suaveolens*, a Bolivian plant of comparatively recent importation, with large white fragrant blossoms, similar in form to those of the common periwinkle, *Vinca major*; both plants belonging to the same natural order, the Dogbanes.

The *Mandevilla* is generally treated as a tender plant, being sometimes grown in a warm greenhouse or conservatory, but not unfrequently in the stove. When cultivated in the border of a good greenhouse, its blossoms are earlier and more copiously produced than in the open air; but with the average temperature of our summers, in good loam, enriched with rotten manure, and a warm situation, it succeeds well out-of-doors in the summer months. A good display of flowers cannot be expected unless the plant be two or three seasons old; and in order to insure its safe removal in the autumn, the pot, which should be very large, may be plunged into the border, the bottom being first broken out, to allow the roots to extend themselves freely. Its branches grow to a considerable length in a single season, but in autumn they may, if necessary, be pruned back to within three or four feet of soil. It requires to be kept from frost in winter, and may be propagated by seeds, or cuttings of the root. On an arched trellis, this noble plant forms a striking object when in flower.

Fully equal to it, however, is the *Tacsonia manicata*, a plant allied to the passion-flowers, with blossoms of the richest scarlet, which, in established specimens, are freely produced. Like the *Mandevilla*, the *Tacsonias* are classed as greenhouse climbers; but old and well-ripened plants would probably bear our average winters with a little protection, which, in the case of such splendid plants, is well deserved. The *Tacsonias* require a peat soil, but will scarcely need so much space for their roots as the *Mandevilla*, and may have their pots plunged into the border, or turned out if the pot is small.

T. pinnatistipula and *T. mollissima* are commoner plants than the *T. manicata*, but somewhat inferior in beauty; they are, however, well deserving of cultivation. The *T. mollissima* is the most prolific of flowers. They are all increased by cuttings under a glass; the *T. pinnatistipula* does better grafted upon the *T. mollissima* than upon its own roots.

Far less rare, but scarcely less worthy of attention, is the old and popular *Eccremocarpus scaber* (the *Calampelis scapho* of modern authors). This is too well known to need more than a passing notice; it may, however, be worth while remarking that it is so hardy as to require but a covering of dry litter, fern leaves, or coal ashes over its roots; and plants raised from seed early in the spring will flower the first season, though less freely than subsequently. We have seen specimens of this plant twenty feet high.

Another interesting and favourite climber of rapid growth is the *Cobæa scandens*, with pinnated leaves, terminated by a tendril and large bell-shaped flowers, which are first green, and ultimately change to purple. It may be raised from seed, which is not, however, often ripened in the open air, but may always be obtained

at any of the seed shops. If plants are bought at the nurseries, those one year old at least should be procured; though, if the seedlings are raised early in the season, they will flower the first summer.

Cobæa stipularis has yellow blossoms. Both species require more protection than the *Eccremocarpus*, but will sometimes survive a moderate winter.

Next on the list stand the *Lophospermums*, of most restricted growth, but abundant flowers. There are several varieties, though we have not yet seen any improvement on the old *L. scandens*, which has dark rose-coloured blossoms, greatly resembling those of the Foxglove. The *Rhodochiton volubile*, sometimes termed *Lophospermum rhodochiton*, with pendulous flowers of a very dark purple, also well merits a place upon a west wall, where it will suffer less from the red spider, to which it is rather subject, than in southerly aspects. Both these plants and their varieties are easily propagated by cuttings in summer, as well as by seeds. They are, however, too succulent to bear exposure throughout the year.

The beautiful *Maurandya barclayana*, with rich violet blossoms, is considerably hardier than the *Lophospermums*. We have known it to remain fresh and green throughout the winter, upon a dry subsoil, though it must be admitted that, in general, it will not survive unless matted up. The rose-coloured varieties of this plant produce a good effect grown in contrast with it. All are propagated by seeds or cuttings. In height they rarely exceed four or five feet.

The old *Sollya heterophylla*, and the more recently introduced *S. linearis*, are both very pretty evergreen half-hardy climbers. In the south of England and south of Ireland, the *S. heterophylla* is sufficiently hardy to bear exposure against a wall, with a slight protection in very severe winters.

The *Sollya heterophylla* reaches the height of five or six feet; *S. linearis* about four or five feet. Both have bright blue flowers, those of the latter species being much the largest. Propagated both by seeds and cuttings.

To the foregoing, we may add the *Solanum jasminoides*, an evergreen of rapid growth, with pink flowers very freely produced. It is usually treated as a greenhouse plant, but appears to be quite hardy on a wall. At Kew, several plants have been exposed in winter, with scarcely any protection. And we think that if the stems were well matted up, and the roots carefully screened from excess of moisture in autumn, that it would pass unscathed through our moderate winters, in the midland and eastern counties.

Among the convolvulus tribe are several very showy, almost hardy plants, the most generally useful of which is, perhaps, the *Calystegia pubescens*, remarkable for producing the only double flowers of the order. We find this plant to be quite hardy in ordinary winters. It dies down annually, and succeeds best in a good rich loam, in which its growth is very luxuriant. The flowers are large, and compensate for every imperfection of form by their great abundance.

In the allied genus *Convolvulus*, we have some very interesting species. *C. bryoniaefolius*, *C. chinensis*, *C. hirsutus*, *C. emarginatus*, and *C. italicus* are the most desirable, and are as hardy as the *Calystegia*. Like that, these are herbaceous perennials, the stem dying down every season. The popular annual known as the Major Convolvulus, though it is in fact a *Pharbitis*, is too familiar to need any extended notice; but one of the perennial species of the same genus claims a few words, the *Pharbitis learii*, the most splendid plant of the whole order, though too tender to bear a prolonged exposure to the open air. It will, however, succeed in warm situations along a south wall in the summer months, where, if its growth is less luxuriant than in the greenhouse or stove, it nevertheless forms an exceedingly attractive object. It is readily increased by layers of the bottom shoots.

The genus *Tropæolum* brings us to the annual climbers, of which the pretty *T. canariense*, or canary flower, is perhaps the most popular, though it contains many perennial species. One of the most interesting of these, the *T. speciosum*, succeeds best against a north wall. Two other species, the *T. pentaphyllum* (the *Chymocarpus pentaphyllus* of some authors) and *T. tuberosum*, are sometimes recommended, though less remarkable than some others of the family. All the *Tropæolums* deserve a trial in the open border, even the most tender of them.

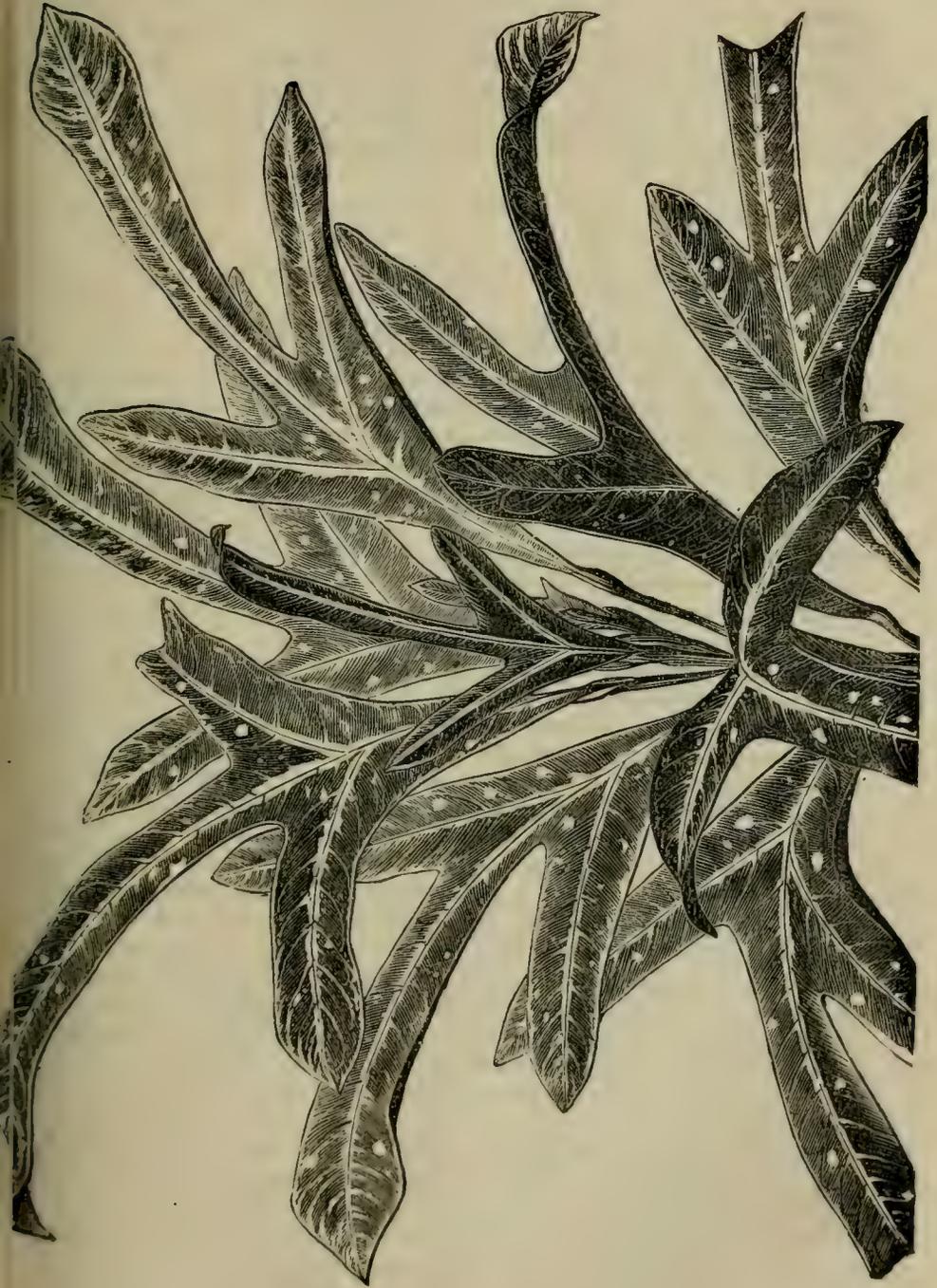
Of the *Annual* climbers, we have but space to remark that the most desirable—in addition to the *Tropæolums* and *Convolvulus*, already referred to—are the *Thunbergias*, of which there are several species and varieties; the *Seypanthus elegans*, belonging to the *Loasa* family, but without their stinging properties, the *Loasa aurantiaca*, and the different annual species of *Lathyrus*, or sweet pea, all of which, with the exception of the last, require to be raised on a hot-bed, and subsequently turned into the border in May.

We have by no means exhausted the list either of annual or perennial climbers, but want of space compels us to terminate our observations, only remarking, in conclusion, that however beautiful this class of plants may be when well grown and carefully trained, none are more unsightly when neglected.

CROTON DISRAELI.



IS fine *Croton* claims especial attention at the hands of cultivators, for it is alike remarkable for its distinctiveness and highly ornamental appearance, and most desirable for the choicest collection of fine foliage plants. The leaves are trilobate in form, the middle lobe being greatly elongated with a broader expansion towards the extremity, the two lateral lobes are comparatively short, of unequal size and length, and expanding from the midrib at about one-third of its length from the base. The colouring of the foliage is



CROTON DISRAELI.

exceedingly rich and varied, for the leaves are marked and blotched with deep yellow, rich orange, and brilliant red, and in combination with the bright green ground of the young leaves, and the deep bronzy green of those fully matured, produce a most striking effect. The plant is robust, yet compact in habit, and the leafage is ample, and small examples are well suited for the decoration of the dinner table, whilst large specimens are well suited for figuring in competitive groups. It was introduced by Messrs. J. Veitch and Sons, Royal Exotic Nursery, King's Road, Chelsea.

THE USES OF THE GARDEN FRAME.

RAISING VEGETABLE AND FLOWER SEEDS.



IN our last number we treated of forcing the cucumber, and while the cucumber is growing, advantage of the space may be taken to raise a number of vegetable and flower seeds, the plants of which will be found useful for planting out in the open ground. Besides these, there may be pans sown with mustard and cress, which, in the course of a few days, will furnish an early salad, and of which a succession may be kept up during the spring. Of the plants which we would raise in a hot-bed, we would particularize the capsicum, tomato or love apple, and the vegetable marrow.

The Capsicum.—The pods of the capsicum are highly valued by some as an ingredient in hot pickle. They are used green, and are generally fit for this purpose about the end of August, or beginning of September. The seed should be sown about the end of March, the quantity of seed being regulated by the extent of the cultivation which is intended to be carried out. It should be sown in pots, and covered about a quarter of an inch deep with soil. When the plants have grown, and acquired about six leaves, they should be pricked off into pans, where they should remain until they have acquired some strength, and then they may again be transplanted in rows on the outside of the bed. About the end of May, or beginning of June, they may be planted out in a warm border, and protected for some time by hand-glasses. When they are transplanted to the situations they are intended to occupy, they should be two feet asunder, and well shaded from the sun until they have taken firm hold of the ground, after which they may be left to themselves.

Tomato or Love Apple.—This is a plant, the fruit of which is not duly appreciated by the middle classes of the population of this country, otherwise it would be more generally cultivated than it is. Whether for soups, sauce, or pickles, there is, perhaps, no vegetable to surpass or even to equal it. We could here furnish a recipe or two instructing how best to use them, but as that is out of our province, we must refer the reader to Mrs. Rundall, or some other lady, whose skill in these matters is more becoming them than us. What

we profess to do, is to teach the way to produce them. The seed should be sown in pots any time in March, and kept in the hot-bed. They should be covered from a quarter to half an inch deep with soil. When the plants are up, and have attained two or three inches high, they may be pricked out either in rows on the outside border of the bed, or in small pots, putting only one plant in a pot. As they gain strength and increase in size, let them be shifted into larger pots; and, by the latter end of May, they will be ready to be transplanted to their final destination, which should be in a sheltered situation, with good exposure to the sun. Some should also be planted against a wall, or trained to a trellis; and when they have made a free growth, they should be carefully trained to whatever object they may be in contact. When they have shown a requisite quantity of fruit, the shoots should be pinched off, so as to throw all the vigour into the fruit, which will now swell and increase to a desirable size. It must be borne in mind in cultivating this plant in this climate, that the first-formed fruit only will be brought to maturity, and to allow the plant to go on setting an additional quantity, which will never ripen, is only to exhaust its strength, and thereby injure that which it has already produced. The fruit will ripen in succession during September till the early part of October.

Vegetable Marrow.—This, also, is a very excellent vegetable, which is not so extensively cultivated as it might be; and as there is nothing peculiar or difficult in the management, there is no garden, however small, which need be without it. The seeds should be sown in a pot about the first or second week in April, and treated much in the same way as we have directed for cucumbers. When they have shed the seed envelope, pot them off into small pots, putting one plant into each pot, and keep them in the frame until they have made a free growth. They must then be “stopped,” and about the last week in May plant them out in a favourable situation, with a considerable mass of well-rotted dung at the roots. When it is practicable, the best situation is on an old hot-bed. If well fed, they will grow luxuriantly, and as the vine becomes strong, it should be pegged down at intervals, when it will take root, and contribute much towards the strength of the plant. This is a most useful culinary plant. The fruit is ready for use when not larger than a goose’s egg, and they ought never to be allowed to grow too large.

There are several other varieties of vegetables which, though not, properly speaking, belonging to the hot-bed department, are nevertheless, when wanted early, raised in this way: these are broccoli, cauliflower, and celery. When, as is sometimes the case, these are wanted early, they are sown in pans, and pricked out, when large enough, either on a hot-bed hooped over and covered with a mat, or in some very warm and sheltered situation, and protected with the lights of a frame which is not in use. After remaining for some time in this situation, and having gained strength, they are planted out where they are to remain, when the weather is favourable for such a purpose.

Besides the vegetables which we have mentioned as desirable to raise in the hot-bed frame, there are also some of the tender annuals,

which should not be lost sight of, and which will, during the summer and autumn months, contribute very much towards the ornament and pleasure not only of the garden, but also of the sitting-room and balcony. Of these, we may mention balsams, browallias, cocks-combs, ice plant, marvel of Peru, sensitive plant, and thunbergias. The ice plant and sensitive plant are more curious than ornamental; but, like birds of the finest song, which have but unattractive plumage, these very interesting plants, though they have no floral beauties to display, will be found to contribute no small amount of pleasure and gratification.

Balsams.—There is not, perhaps, a more gorgeous flower grown than the balsam, and the great perfection to which they have of late years been brought, both as regards the variety of their colours and the immense size of their flowers, has made them even of more general cultivation than heretofore. There are two modes of growing the balsam: the one when it is desired to have a bushy, shrubby-looking, little tree, and the other when one straight rod or spike of bloom is preferred. But, first of all, let us turn our attention to raising the plants; and this should be done from the middle of March till the beginning of April. The seed should be sown in a pot containing fine, light, sandy loam, with a good proportion of vegetable mould. The pot should then be plunged in the bed of the frame, and in the course of six or eight days the plants will appear above the surface; and when they have attained the height of about three inches pot them off into small pots, and again plunge them into the hot-bed. The soil on this occasion should have a little well-decomposed stable-dung mixed with it; and place them near the back of the frame, so that they may get as much air as possible by the apertures when the lights are open. As the roots fill the pot, the plants must be regularly shifted, care being taken never to allow them to become “pot-bound.” In this way they must be continued, adding a greater portion of rotten dung at every shift, until they are in eight or twelve-inch pots; and during the whole of this progress they must have abundance of water. To have them of the fine bushy habit spoken of above, they must now have plenty of room, and be regularly supplied with waterings of manure-water; they will then acquire a great size both in height and breadth. But if the other mode is desired—viz., to have simply a tall spike studded with bloom, the plants must be stunted a little in their growth when they are in four or five-inch pots; and, when they show flower, select those only which exhibit the most excellent properties either as regards colour or size. Let them be kept close together, and without much air, they will then be drawn up, and instead of branching at the side, will present a mass of finely-developed flowers. About the end of May, or beginning of June, the plants may be introduced into the open border, having previously opened holes to receive them—about two or three feet apart from each other—and into these holes supply a pretty liberal quantity of well-rotted manure. In such a situation the balsam will bloom freely during the whole of the summer and autumn months, and will only be terminated by the frost of October.

Cockscombs.—As there is little difference between the treatment of the balsam and cockscomb, the instructions previously given will be quite applicable in this case. It is not necessary, however, to grow the cockscomb in such large pots as the balsam.

Ice Plant.—Although there is nothing in the floral character of this interesting little plant to recommend it in the flower garden, still there is something about the peculiar crystalline, or rather glacial appearance which it exhibits, to make it attractive. The seeds should be sown in a pot, and very slightly covered with finely-sifted vegetable mould; and when the plants have made three or four leaves, they ought then to be potted off into what are called small sixty pots, and kept in the frame till the roots have almost filled the pots. If it is intended to have large spreading plants, they may be re-potted into pots two sizes larger, and gradually hardened off till they are planted out in June. The best situation for displaying this beautiful little plant is on rockwork, and planted in rather poor soil.

Ipomœas.—These are very ornamental and elegant annuals, producing, throughout a great part of the summer and autumn, a profusion of the most elegant flowers. When trained to a trellis or on sticks, they form an admirable screen. Of these the *I. coccinea* and *Burridgii* are the finest. They require to be sown in pots three inches and a half wide at the top, and filled with light sandy loam, peat, and leaf-mould, to which should be added a liberal supply of silver sand, in sufficient quantity so as to render the whole quite porous, and to allow the water to percolate freely. When the plants have fully developed their seed-leaves, they should be carefully raised with a stick from the seed-pot and transplanted into the same sized pots, filled with similar soil as the others. In a short time they will begin to throw up a long twining shoot, which should be supported by placing a stick in each pot, to which the plants may entwine. After they have filled the pots with roots, they may then be planted out in the situations they are intended to occupy.

Sensitive Plant.—This is, strictly speaking, a tender plant, and will not endure exposure even during our warm summer in an open border; it will therefore require to be kept constantly in the frame. It is, perhaps, one of the most interesting plants known, from possessing the singular property of folding up its leaves on receiving the slightest touch; and, if roughly handled, the whole plant will become as if paralysed. The leaf-stalk appears as if attached to the plant by a joint, and when touched it falls down, and presents all the appearance as if endowed with something more than vegetable life. The seed should be sown in five-inch pots, containing a soil composed of light sandy loam, vegetable mould, peat, and a good proportion of silver sand. Let them be watered sparingly, at least only sufficiently to enable the seeds to germinate. When they have made two or three leaves, let them be transplanted into small pots containing a similar soil, but the pots must be well drained; when they have filled these pots, let them be removed into those which are six inches wide at the top, and this will be their last shift. To render the plants bushy, they should from time to time have

their extremities pinched off, and this will add much to their appearance.

Thunbergia alata.—The popular name of this pretty annual among gardeners is Black-eyed Susan. It is not, strictly speaking, an annual, but as it succeeds well when treated as such, and as it is a most desirable addition to the flower garden, we have deemed it advisable to introduce it here. There are many plants which are treated in this country as annuals, which are in reality perennial in their native soil. Even the sweet mignonette, if kept during the winter in a greenhouse, will preserve a shrubby habit of growth, and may, by proper care and treatment, be made to last for several years. So in this respect we may admit the *Thunbergia alata* among the number of our tender annuals. This plant requires rather more attention than those which we have already mentioned. The seeds should be sown in pots filled with soil composed of one-half leaf-mould, and the other half sand; at the bottom of the pots there must be ample provision for drainage, for the soil requires to be kept constantly moist; it must not, however, be either saturated with water, or ever allowed to become dry, for in each case the plants are almost sure to die off. When the plants are large enough, they should be moved into larger pots, and, after they have gained strength, planted out in May. If it is intended to treat this as a climber, it must be trained to a stick or on a trellis; but if a bushy habit of growth is desired, this can be obtained by pinching off the extremities of the shoots and preventing their development. It may also be pegged down and made to trail over the surface of the ground in the same way as verbenas and petunias are sometimes treated.

Tropæolum canariense or *peregrinum*.—This is a most desirable and one of the most beautiful climbing annuals which has been introduced to the English flower garden, and the great care with which it is cultivated renders it a favourite with all who are fond of a garden. The soil in which it delights most is a fine sandy loam, vegetable, or what is generally called leaf-mould, and plenty of silver sand. The seeds are to be sown in a flower-pot or seed-pan, and covered about half an inch with finely-sifted leaf-mould and sand. They should then be placed in the frame and watered rather sparingly at first; but when the plants begin to show themselves, the allowance of water may be increased a little, and a more liberal supply given when the plants are fully started in their growth; the pots, however, must be well drained. When the plants have shed the seed envelope, and fully developed the cotyledons or seminal leaves, they should be transplanted singly into small sixty pots filled with soil similar to what is recommended above. They will soon begin to push and fill the pot with roots, and when this is the case, they must be re-potted into what are called forty-eight-sized pots. When they have attained about six or eight inches in length, they begin to show a disposition to entwine themselves to some support; they must then be severally furnished with a single stake, to which they may either be tied or allowed to attach themselves. As they gain strength and push out a long straggling shoot, they must be gradually hardened off, and in the end of May or beginning

of June, planted out in the situation which they are intended to occupy. The soil in which they are planted out should be made very rich, with a rather large proportion of well-rotted dung, sandy loam, and silver sand. If there is not a trellis to train them to, they must be sticked in the same way as peas are done, and they will very soon cover the space which has been appropriated to them, and form a complete mass of beautiful yellow flowers. It will be found very advantageous to water them with liquid manure, or place well-rotted dung on the surface of the ground, and allow it to be washed in. This will make the plant strong, both in growth and bloom. Those of our readers who were resident at the west-end of London, or who were in the habit of walking in Hyde Park some years ago, must have observed the success with which the gatekeeper on the south side of the park cultivated this beautiful plant. We were often much struck with the neatness with which the keeper at the lodge near the Kensington turnpike trained his plants all round the sides and ends of his little lodge, and the taste he displayed in the arcade formed of *Tropæolum* leading to the door of his dwelling. This is a plant which will well repay any one for cultivating. Even those who may be induced to do so for a pecuniary remuneration will find it productive also in that respect, the seed always being in demand by the London seedsmen. The gatekeeper of Hyde Park already alluded to, we have known to receive as much as five guineas for one year's produce of the plants grown upon his trellises. It is very commonly called the Canary Plant, and is with some as great a pet as the little songster after which it is named is with his admirers.

Although there are many other tender annuals which we could have introduced as capable of being raised in the frame, still it is not within the province of this essay to treat at large upon these matters. To do justice to such a subject would occupy more space than we can afford. Our object in introducing those we have, is simply to guide the horticulturist to the most profitable way of using his frame, leaving him to extend the practice which we have here recommended.

Our attention has hitherto been engaged with what has been going on in the interior of the frame, and how best we could occupy the space before the cucumber attains its full growth. We shall now look outwards for a little, and see what use can be made of that part which occupies the external margin of the bed. It will be remembered that in laying out the bed, we recommended that it should be eighteen inches wider on all sides than the frame. In general, there is no use whatever made of this margin, but we have always found as much advantage derived from it as there is from the inside. About the middle of March cover the surface of the margin of the bed with finely-sifted soil, composed of sandy loam, vegetable mould, and a little rotten dung, to the depth of about four inches. Let this be done on the south side of the bed, and it will be found an excellent situation for raising all the half-hardy annuals; this will answer all the purpose required, and save the expense and trouble of raising another bed for the purpose, as is generally recommended by writers

on this subject. The length of the bed being thirteen feet, by deducting six inches at each end, twelve feet clear will be left available for this purpose. The seeds should be sown in drills three inches apart; this will give forty-eight drills of upwards of a foot in length, and the quantity of seeds which can be raised on this space will be more than sufficient for the supply of any suburban flower garden. If a few choice varieties are selected to be grown, then two or three rows can be devoted to one sort. The annuals which we would recommend for this purpose are as follows:—

Argemone mexicana, *grandiflora*, and *ochroleuca*; China Asters of the best German selected varieties; *Brachycome iberidifolia*; *Clintonia elegans* and *pulchella*; *Collinsia bicolor* and *grandiflora*; *Eutoca multiflora*, *viscida*, and *Wrangleana*; *Hibiscus Africanus major*; African and French Marigolds of the most choice varieties; *Phlox Drummondii*; Chinese Pink; *Schizanthus pinnatus*, *Grahami*, and *retusus*; Ten-week, Brompton, and Queen Stocks of the finest selected German varieties; *Viscaria oculata* and *Zinnia elegans*, with its finest varieties. These are a few half-hardy annuals, which may be sown in this position. They may all be sown about the last week in March or first of April, but not too thickly. When they have grown so much as to begin to crowd each other, they must be pricked out into rows all round the east, north, and west sides, which should first be also covered in the same way with soil as we directed for the south side; after remaining there till they have acquired some degree of strength, they may be removed to the places they are intended to occupy in the flower garden.

Having now concluded our remarks on the employment of the garden frame in forcing, we will in the next number turn our attention to the next most important use to which it is applicable, namely, for propagation.

(To be continued.)

PLANTS IN OUR DWELLINGS—ARE THEY BENEFICIAL OR NOT?

BY JOHN R. MOLLISON.



WE have here a very important question to consider, that is, whether it is beneficial, wholesome, or otherwise, to have flowers in our dwellings? I have heard it said by people who pretended to know, that you should not have flowers in your house at all, as it is greatly against the health of the inmates, because the noxious gases they give out have a baneful effect on the air, especially if they are in the sleeping apartments. I hope to be able to show you that such an idea is to a great extent chimerical.

All plants absorb through their leaves carbonic acid gas from the air around them. Now this carbonic acid gas is composed of carbon and oxygen. During the hours of daylight the plant retains the carbon and releases the oxygen—giving it out to the air again.

Now with us and all animal life this order of things is reversed, for we retain the oxygen and give out the carbon. Therefore, during the hours of daylight the oxygen without which we could not live is given out by the plants, while they retain the carbon which affords them nourishment, while it would kill us if we breathed it. During the day, however, dead leaves and diseased parts of plants and also the flowers give out a small portion of carbon, but it has no effect on the air if the plants are kept free of dead leaves and decaying parts; the great amount of leafage on a plant will absorb far more carbon than the blossoms can give out. Thus you see plants in a room during daylight are really a benefit instead of being otherwise, since they purify the air by absorbing and removing carbon, which is injurious to our health, giving out at the same time oxygen, which is a necessity of our life. So much cannot be said for them after daylight departs; then the order of things is reversed, for during the hours of darkness the plants absorb and retain oxygen and release and give out carbon to the air; this of necessity would be injurious to our health if there were no remedy or counteracting influence to nullify the bad effects. You can receive no harm from the carbon if you leave your bedroom window a little open during the night to cause a circulation of fresh air; the least bit will do. You should do this in any case during summer, for it is very beneficial to the health of the sleepers. Or if you place the plants on the floor the evil will be remedied to a great extent, for the carbon which is half as heavy as common air, will fall to the floor. But when we know that "we breathe out but a small quantity of carbon during the hours of sleep as compared with the quantity exhaled during the day," and that "the quantity of carbon given out by the plants at the same time is not large," the presence of plants in your bedroom at night can scarcely have any bad effect. I hope you understand this clearly. It is a rather confusing statement of the case, but it proves that there need be no fears of any evil effects arising from having plants in your rooms, either day or night. But there is one exception to the rule; it is known that the blossoms of plants give out more carbon than any other part, therefore hand or table bouquets should not stand in your room during the hours of sleep. Of course you can avoid this by having them put somewhere else till morning.

There is another question of very great importance regarding having flowers in your room after daylight, that is, is it natural and healthy for the plants themselves? When night comes on and brings its season of rest to us, we never consider that our poor plants incline for rest too. All plants in the open air go to sleep, so to speak, when the hours of darkness set in. The air becomes several degrees colder, soothing their strained energies, and hushing them into their natural rest, which enables them to meet with renewed vigour the rays of burning sunshine when day returns. Now when night comes on we draw down the blinds, shut our doors and windows, stir up the fire and crowd around the cheerful hearth all unconscious that by keeping out the cold and raising the temperature of the room several degrees we are keeping the poor plants

in a state of unhealthy excitement, keeping them feverishly awake when they should be at rest. Thus like ourselves when we get no rest during the day and no sleep during night, they grow weak and sickly, losing the fresh robust appearance they wore when we first made their acquaintance. Try, if possible, therefore, to give your plants cool dark quarters during the night, for on this greatly depends your success as a window gardener. Window gardening at best is plant growing under difficulties; the more therefore you can assimilate their existence to the life of the same plants in their natural homes the more successful you will be.

Gas has a most poisonous effect on plants in a room. In fact, no plant can live or thrive in a room where gas is burned. Then it is a necessity to remove them from the room during night, and place them where they will not breathe the poisonous gas. A passage or lobby is a very suitable place till morning, provided there is no danger of frost in the winter.

Plants growing in a room require a good deal of shifting about. You should never allow yourself to consider this a trouble. The poor plants have life within them, and they appreciate in their own dumb way all attentive kindnesses bestowed on them; a lover of flowers will understand this plainly, who sees in his plants so many little beings depending upon him or her for their very existence. Be careful and kind to your plants and they will do their very best to please and reward you.

ANNUALS ADAPTED FOR BEDDING.



THE following list of hardy summer and autumn flowering annuals is offered for the convenience of those whose time and limited means prevent their attention to the general class of half-hardy and tender plants for effect, *en masse*, in flower gardens. The descriptions are intended to convey an idea of their average height, colour, and habit. A simple mode of managing these seeds is either to sow in drills, or otherwise broadcast over the entire bed, or border, and cover the seeds slightly with finely-sifted old tan, or friable loamy soil.

BRANCHING LARKSPUR.—An ornamental late summer flowering annual, two to three feet high, of erect branching habit, with numerous racemes of variously shaded brilliant blue-coloured blossoms. Admirably adapted for grouping in shrubberies and plantations.

CLADANTHUS ARABICUS.—A neat compact plant, from nine to twelve inches high, of a divaricately branching habit, with dark green, narrow-lobed leaves, richly contrasted with bright golden yellow, close-petalled, chrysanthemum-like flower, about one and a-quarter inch wide.

CAPE MARIGOLD.—A dwarf compact annual, from nine to twelve inches high, bearing a profusion of snow-white single chrysanthemum-

like close-lobed blossoms, one and a half inch to two inches in diameter.

CHRYSANTHEMUM TRICOLOR.—A neat, branching, fleshy-stemmed plant, from twelve to sixteen inches high, with narrowly divided leaves, and a profusion of large, beautiful, clear white blossoms, two inches wide, ornamented with a yellow band towards the base, and picturesquely diversified by a rich olive-brown centre.

CLARKIA ELEGANS ALBA.—An erect and compact branching annual from twelve to sixteen inches high, with comparatively small foliage, and dense masses of elegantly lobed snow-white flowers, one and a quarter inch wide.

COLLINSIA HETEROPHYLLA.—An elegant dwarf compact species, of neat habit, with massive clustered racemes of white and purple flowers.

CALLICHOEA PLATYGLOSSA.—A slender stemmed annual, twelve inches high, with neat linear leaves, and conspicuously bright yellow, close petalled, chrysanthemum-like flowers, one and a half inch wide.

CHRYSANTHEMUM CENTROSPERMUM.—A late summer and autumn-flowering species, two and a half to three and a half feet high, of erect branching habit, deeply toothed or lobed leaves, and numerous golden-yellow marigold-like blossoms, well adapted for effect in large borders.

CONVOLVULUS MINOR ANTOPURPUREUS.—A decumbent spreading plant, attaining from nine to twelve inches high, and ornamented with a profusion of large and conspicuously rich purple-blue expanded funnel-shaped blossoms, two inches wide.

CYNOGLOSSUM LINIFOLIUM.—A remarkable compact plant, of erect dense growth, with grey or glaucous-white leaves, and studded towards the upper part with a profusion of snow-white circular, ribbed, salver-shaped blossoms.

ERYSIMUM PEROFFSKIANUM.—A neat erect plant, reaching from twelve to sixteen inches high, with small, wallflower-like leaves, and numerous terminal open racemes of brilliant orange coloured blossoms.

EUPHARIDIUM GRANDIFLORUM.—A very neat compact, branching plant, twelve inches high, with small ovate leaves, and numerous rose-coloured, Clarkia-like blossoms, one inch in diameter.

EUTOCA VISCIDA.—A compact growing annual, of branching habit, rising from twelve to sixteen inches high, with notched heart-shaped blossoms, of a rich ultramarine blue tint.

ESCHSCHOLTZIA CROCEA.—A highly ornamental annual (or biennial) plant, from twelve to sixteen inches high, with narrow lobed glaucous leaves, and a profusion of large and brilliant orange-yellow poppy-like flowers, three and a-half inches in diameter.

EUPHARIDIUM CONCINNUM.—An erect cœnothera-like plant, nine to twelve inches high, of neat habit, with small dark green leaves, and laden with deeply-lobed, bright rosy coloured clarkia-like flowers.

EUTOCA WRANGELIANA.—A low-growing species with decumbent stems, rising *en masse*, six to nine inches high, and covered with a profusion of bluish salver-shaped flowers in clusters.

GOETIA LINDLEYANA.—A late summer-flowering annual, eighteen

inches to two feet high, of neat habit, upright growth, medium sized foliage, and highly picturesque, and beautiful pale rosy-lilac, open cup-shaped blossoms, blending into a crimson centre.

GODETIA BIFRONS.—An ornamental erect growing plant, of neat habit, eighteen inches to two feet high, with medium sized leaves, and terminal racemes of large conspicuous rosy lilac, cup or salver-shaped flowers, two inches wide, picturesquely marked with bright rosy crimson cloud-like spots in the centre of the flower lobes or petals.

GODETIA RUBICUNDA.—An ornamental species, eighteen inches to two feet high, of neat, erect, branching habit, with medium sized leaves, and long terminal spikes of numerous large close-petalled, light pink, cup-shaped or salver-like blossoms, deepening into a conspicuous light crimson centre.

GILIA NIVALIS.—A neat dwarf, slender annual, of branching habits, attaining from twelve to sixteen inches high, with light foliage, and numerous branching clusters of clear creamy white blossoms.

HELIOPHILA ARABOIDES.—A prostrate spreading plant, with diverging shoots or stems, which are elegantly studded over with numerous close-petalled rich blue, compact salver-shaped blossoms, half an inch wide.

HELICHRYSUM BRACTEATUM.—A neat, erect, branching, late-flowering plant, two to three feet high, with dark green willow-shaped leaves, and numerous terminal, conspicuous clusters of golden yellow "everlasting flowers."

HELICHRYSUM MACRANTHUM.—Similar in habit to the preceding species, with green willow-shaped leaves, and terminal upper clusters of clear white "everlasting flowers," elegantly suffused with rose or pink. This interesting plant, as well as the preceding, withstands the influence of the autumnal frosts.

HIBISCUS AFRICANUS.—An upright, branching plant, growing from nine to eighteen inches high, with deeply-lobed or divided leaves, and remarkably large, close petalled, bright, sulphur-coloured hollyhock-like flowers, four to six inches wide, beautifully ornamented with a rich and conspicuous dark velvet band towards the centre.

IBERIS UMBELLATA RUBRA (Crimson Candytuft).—An erect growing variety, twelve inches high, with narrow lance-shaped leaves, and numerous terminal flattish umbels of rich reddish purple and crimson flowers.

IBERIS CORONARIA and *I. UMBELLATA ALBA* (White Candytuft).—Rising twelve inches high, equally neat and compact in habit, with similar foliage, and profuse terminal branching stems, forming a dense mass of snow-white flower heads.

KAULFUSSIA AMELOIDES.—A dwarf species of neat habit, growing from six to nine inches high, with narrow, strap-shaped leaves, and numerous bright, blue-petalled, daisy-like flowers.

LASTHENIA CALIFORNICA.—A compact plant, rising about twelve inches high, with narrow bright green leaves, and a profusion of conspicuous golden-yellow chrysanthemum-like flowers, three-quarters of an inch wide.

LEPTOSIPHON DENSIFLORUS and **L. ANDROSACEUS**.—Both remarkably neat dwarf species, with narrow, dark green, needle or larch-like leaves, and furnished with numerous terminal clusters of variously shaded pale rosy, pink, and white-lobed, salver-shaped flowers, in July and August.

LUPINUS NANUS.—An extremely pretty species, with small hand-shaped leaves, and numerous long terminal erect spikes of elegant blue and white pea-shaped flowers.

LUPINUS CRUICKSHANKII.—An extremely beautiful late summer and autumn-flowering species, two to three feet high, of neat erect branching growth, with smooth finger-lobed leaves and terminal spikes or racemes of richly blended blue, white, and yellow pea-shaped flowers.

MALOPE GRANDIFLORA.—A highly-ornamental annual, two to three feet high, with obtusely-lobed mallow-like leaves, and numerous remarkably large, and beautiful rich crimson salver-shaped flowers, four to six inches wide.

NEMOPHILA INSIGNIS GRANDIFLORA.—A very beautiful trailing variety, with comparatively light foliage, and studded over with thousands of bright azure-blue, salver-shaped flowers, three-quarters of an inch broad.

NEW GOLDEN CHRYSANTHEMUM.—An erect compact branching annual, from twelve to sixteen inches high, with deeply-divided dark green leaves, and numerous clear golden-yellow marigold-like flowers, each one and a-half to two inches wide, beautifully contrasted in colour by a rich olive-brown circle towards the centre.

SANVITALIA PROCUMBENS.—A neat compact growing plant, rising from four to six inches high, with small, oval, dark-green leaves, and numerous orange-rayed Rudbeckia-like flowers, three-fourths of an inch wide, richly diversified with a black centre.

SILENE RUBELLA.—A neat plant, twelve inches high, with broad ovate glossy leaves, and numerous terminal clusters of loose purplish rose-coloured blossoms.

SWEET SULTAN.—An upright growing plant, eighteen inches to two feet high, producing many conspicuously-ornamental, large, clear white, thistle-like flowers.

TANGIER PEA (LATHYRUS TINGITANUS).—A very elegant twining annual plant, three to four feet high, with medium-sized foliage, and numerous clusters of remarkably rich violet-crimson blossoms.

YELLOW HAWKWEED.—A somewhat loose growing and slender branched plant, twelve to sixteen inches high, ornamented with a profusion of very neat pale yellow, or brimstone-coloured marigold-like blossoms, about one and a-half inch wide, which are singularly diversified with a double interior row of smaller orange-yellow petals, the whole being relieved by the contrasted effect of a large and remarkably beautiful rich dark-brown centre.

TRUFFLES.



THE truffle is a vegetable entirely destitute of roots. It is a rounded subterraneous body, absorbing nourishment upon every part of its surface; and its reproduction is dependent upon bodies generated within its substance. The truffle is composed of globular vesicles, destined for the reproduction of the vegetable, and short and barren filaments, called by M. Turpin, *tigellules*. The whole forms a substance at first white, but which becomes brown by age, with the exception of particular white veins. This change of colour is dependent upon the presence of the reproductive bodies or *truffenelles*. Each globular vesicle is fitted to give birth, in its internal surface, to a multitude of these *truffenelles*; but there are only a few of them which perfect the young vegetable. These dilate considerably, and produce internally other smaller vesicles, of which two, three, or four, increase in size, become brown, are beset with small points on their interior surface, and fill the interior of the large vesicles. The small masses thus formed are the *truffenelles*, and become truffles after the death of their parent. Thus the brown parts of the truffle are those which contain *truffenelles*, and the interposing white veins are the parts which are destitute of *truffenelles*. The parent truffle having accomplished its growth, and the formation of the reproductive bodies within, gradually dissolves and supplies that aliment to the young vegetables which is proper for them.—*Revue Encyc.*

THE HOLLYHOCK.



TO grow the Hollyhock in the garden border is a simple business enough, but to do it well the soil should be deep and rich and damp, the situation open, and the climate gentle. It will grow well, however, on poor dry soils, if aided with a good preparation in the first instance, and plentiful supplies of good manure afterwards. Sewage in a very weak state suits it admirably. Partial shade it bears well, but in a deep shade it scarcely thrives. When standing on a damp soil, and especially in a cold locality, a severe winter is death to it, but under moderately favourable circumstances the plant is quite hardy, and, if allowed to stand for a few years, acquires a buxom character, with its large cluster of spikes, far to be preferred to the single spikes from young plants which content the florist. In making a plantation, secure pot plants of named varieties, the best of which are cheap enough for the humblest amateur. Plant in March or April, at three feet apart every way, arranging the plants, if possible, in accordance with their respective heights and colours. In a kindly season they will flower well if planted as late as May. They should be staked at the time of planting, or soon after, and be

kept carefully and *loosely* tied as they advance, for, if neglected, one small storm may tear the plantation to pieces. To propagate the named sorts, take cuttings from the base of the plants in August, and pot them, and, if possible, promote quick rooting by placing them on a gentle bottom-heat. They must be repotted into separate pots, at least five inches in diameter, in October, and placed in a cold frame or greenhouse for the winter. Good seed will produce good plants, and therefore a stock may be got quickly by the most trifling cost. If the seed is sown in February in a gentle heat, and grown on with careful regard to the fact that the plant is hardy and cannot well endure a strong heat, the seedlings may be planted out in May, and will bloom well the same season. Those who cannot manage them in this way had better sow seed in July; and as soon as the plants are large enough to handle, plant them out in a bed of sandy soil, in a frame where they may remain until the time arrives for planting out in the following spring.

THE CULTIVATION OF LOBELIA.



THE best method to obtain a good stock of Lobelia, is to raise the plants from cuttings, selecting for the purpose the best varieties obtainable. In the first place, plant out a few of the selected sorts, at the end of May, in some out of the way place and let them grow and flower as they like. About the middle of July cut them down pretty close to the ground, and they will soon after bristle with new tender shoots. These must not be allowed to flower, but as soon as they have attained a length of about two inches, take them off and dibble them into a bed of sandy soil, in a frame or under hand lights or propagating boxes, keeping them shaded and sprinkled until they have made roots. If they run up quickly to flower, nip out the flower-buds to keep them stocky and strong. Take them up early and pot carefully, keeping them near the glass all the winter, never allowing them to flower. In February these will supply cuttings in great quantity, and any one who can strike a cutting may make a good plant of every one of them. To raise Lobelia from seed is a still simpler matter, and if the seed has been carefully saved, the plants will be tolerably uniform in character, and will be good enough for large gardens, where a few spurious plants in a mass will not be noticed; but seedlings are not to be depended on for highly finished work. Sow the seed in pans or boxes of fine rich sandy soil, covering it with a mere dust of peat or finely sifted leaf-mould. The seed need not be sown until March, as the plants grow rapidly when they have made a start. Lobelias should not be planted out in flower, or with the flower-buds visible. It is best to cut the tops off the plants a week before planting, which will promote a bushy growth, and prepare them to throw out roots vigorously when planted: If planted in flower, they may be expected soon after to go out of flower and remain blank for a month. If treated as here advised, they will be blank for about a fortnight at first, and will

April.

then flower freely for the remainder of the season. None of the old varieties, such as *speciosa* and *gracilis*, are now worth growing, because better can be had. The very dwarf sorts, such as the *pumila* section, are exquisitely beautiful, forming dense cushions solid with bloom of the most pure and brilliant colours. The most useful of them—*Grandiflora*, deep blue; *Azurea*, light blue; and *Annie*, lilac. The following are also first-rate for various purposes in the parterre, and also making charming pot-plants:—*Indigo Blue*, intense deep indigo blue; *Spectabilis*, deep cobalt blue; *Trentham Blue*, clear blue, white eye; and *Mauve Queen*, rosy lilac.

THE GERMAN ASTER—ITS CULTURE FOR EXHIBITION.



THE great cause of failure often arises from the seed being sown too early, so that the plants begin to flower in the long days imperfectly, and by September they are too far spent to produce fine blooms in their proper season. The best time for sowing is some time between the 26th of April and the 14th of May. The seed should be sown in a cold frame under glass, in drills six inches apart, and not too thick in the drills, say the first week in May; the plants come up in a few days, when they must have plenty of air; and as soon as they are about an inch high, take the glass quite off for two or three days, and then prick them out on a slight hot-bed three or four inches apart; here they will take root in a day or two without shade or glass. Before the plants begin to run up in the stem, plant them out where they are to stand for blooming, in well-manured soil, being careful to remove them with as much mould attached to the roots as possible; let the rows be one foot apart and the plants ten inches or a foot apart in the rows. If the weather is dry, they must be watered, until they take root; afterwards keep clean from weeds, stir between the plants, and about the first week in August, top-dress with rotten dung from an old hot-bed (the one on which the young plants were pricked out will be in good state if well beaten up), and give a good soaking of water over all if the soil is dry. The plants will now require to be tied to small stakes, and as soon as it can be seen which buds are likely to make good blooms, thin them out, leaving only three or four to a plant. It will be necessary to protect such blooms intended for exhibition from wet, or friction from the wind.

THE GARDEN GUIDE FOR APRIL.

FLOWER GARDEN.

FARDY annuals and perennials may be sown early in the month, and the more tender kind at the end, but it will be better to defer the sowing of very small seed of choice kinds until the beginning of May, as heavy rain may wash them down into the soil, and they may be lost. Perennials may be planted out, and old stools of phlox, chrysanthemum, sweet william, etc., may be divided. Dahlia-roots may also be planted, but if the shoots appear before the night-frosts are over, they must be protected by flower-pots inverted over them, and the holes stopped with pieces of tile. Box edging should be clipped and ivy cut in and trimmed, and fresh plantations made of last year's roots. Cuttings of ivy may also be taken and planted in a sandy border, only partially exposed to the sun. The cuttings should be short-jointed, and the lower leaves removed. Bulbs of *Tigrida pavonia* may be planted in the open bed; plant them about two inches deep, and choose a warm and sheltered situation. A light netting, or some other similar protection, will be found useful for tulip-beds, and if the foliage gets frozen, water them with cold water before the sun gets on them. The pruning of roses must all be finished early in the month, and recently planted trees should have a good watering. Self-sown annuals that have stood the winter should be thinned, and where desirable, some may be transplanted. Gravel-walks should be turned and rolled, but dry weather should be chosen for this work. Grass-plots should be dressed, and new turf laid down where necessary. In laying down fresh turf, be careful to lay it as soon after it is cut as possible. To keep lawns in good order, it will be necessary to mow twice in the month, and it should be performed on a dewy morning or in moist weather.

KITCHEN GARDEN.

Should the work of last month have been delayed, successional sowings may be made of all leading kitchen crops; seeds got in early will not be much behind those sown last month. Beet should be sown in the second week, in ground deeply dug but not manured. The main crop of celery should be sown on a rich, warm border, the surface to be made light and fine; sow thin and merely dust the seed over. Sow also onions, lettuce, radish, small salad, sea-kale, and asparagus; the last two in drills, one foot apart and one inch deep for asparagus, and two inches for sea-kale. Potatoes not yet planted should be got in without delay, and towards the end of the month scarlet-runners and French beans may be sown. The runners should have a warm dry position if sown before the first of May, but subsequent to that date, they may be sown in almost any soil or situation without risk, but like most other things, they yield the best crops on ground well dug and manured. The main crop of carrots should be got in towards the end of the month, and there is still time for a crop of parsnips if none have yet been sown. In the beginning of the month, make ridges for melons and cucumbers to be grown under hand-glasses. Sow thyme, summer savoy, and all other herbs, or if the weather is moist put in slips, and if possible plant them in a rather dry sandy border, as they will root quicker. Plant broad beans for a late crop, and continue to sow peas to succeed those already sown. After a shower of rain draw the earth up to the stems of cauliflowers, cabbages, and artichokes which were planted last month, but be careful the earth does not fall into the hearts of the plants. Those who purpose raising seedling rhubarb plants should sow about the middle of the month in shallow drills about eighteen inches apart, dropping the seed in patches, six inches from each other. Slugs, snails, and other insects, tempted out by showers of rain must be destroyed.

FRUIT GARDEN.

Should the weather be dry, all kinds of fruit trees will be benefited by syringing occasionally, but syringing should in no case take place until the blossoms have dropped off; it may then in dry weather prevent the crop dropping in its infant

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state. Should you discover the least appearance of green-fly upon peach and nectarine trees, syringe at once with tobacco-water, and if they should be affected with mildew, sprinkle them with lime-water, and dust them over with sulphur. Peach and nectarine trees against open walls should also be carefully pruned by cutting off all shoots where there is no fruit at the base, except a leading one, and the latest upon a last year's shoot. Apricots, if affected with caterpillars or other insects, must also be syringed with tobacco-water. Cherry trees are subject to attacks of the black insect; should this be observed, syringe with tobacco as for peach or nectarines. Peach walls should be covered with netting during the prevalence of cold winds. Nail in any trees that have been left loose, to keep them back; be careful how you handle the branches, or fruit spurs or pushing buds may be broken off. Use as few shreds as possible, and those as narrow as you dare cut them, having regard to the necessary strength. All pruning ought to have been finished long ago; but should any trees have been neglected, and are in a dense state, thin them out and rub a little clay paint over the parts to encourage the closing of the bark over them.

GREENHOUSE AND CONSERVATORY.

The heat in all plant-houses may now be increased where quick growth or the speedy production of bloom is wanted. Re-pot hard-wooded plants that have flowered, pot firm and give only small shifts. Give abundance of water to genistas, epacrises, acacias, hoveas, chorozemas, and other plants in flower, and as much air as the state of the weather will permit. Soft wooded plants for specimen-flowering should be got into blooming-pots. Examine the earth in all pots to be sure that it is in the proper state of moisture, and should any of them be in too dry a condition, perforate the soil down to the bottom with some smooth instrument, that will not tear or break the fibres of the roots, and water freely with tepid water, especially those in active growth. Should bedding stock be still in request, cuttings may be struck in a brisk heat, even as high as ninety degrees; they will bear a much higher temperature now than they would a month ago.

STOVE.

Be prepared to give the necessary shade to orchids and stove-ferns on bright sunny days, shift into roomy pots all plants of quick growth, and shade for a week or ten days afterwards, and keep them only moderately moist until they make fresh roots. Increase the amount of humidity generally in the atmosphere by sprinkling the walls and floor, but be careful not to overdrench any plants that have not yet got into full seasonable growth.

PITS AND FRAMES

See that the cucumber beds are not too moist or mildew may appear. Add fresh linings and fork up the beds if necessary, give air cautiously, stop and train carefully, and use tobacco at the first appearance of fly. Ridge-cucumbers to be kept as hardy as possible, but they must not be checked. Give them a shift should they require it, and frequently sprinkle over the leaves. Fruiting cucumbers must have shade during mid-day hours now, but keep the lights tilted to give air. Water round the sides of the frames to keep the atmosphere moist. Strawberries ripening to have less moisture and plenty of light; temperature not lower than 55 degrees by night, nor higher than 70 degrees by day. Remove runners from plants coming into fruit; but the runners from plants that have fruited may be allowed to grow, as they will make early plants for forcing next year. Vegetable marrows sown now will produce almost as early as those sown a fortnight or a month ago. It is best to get the plants on singly in pots, as they are shorter and stronger when turned out, than if grown several in a pot and allowed to sprawl about and spindle away their strength

TO CORRESPONDENTS.

ARUM.—*N. J. T., Hornsey.*—Arums are propagated by offsets, of which many are commonly produced. They should have a liberal supply of water. The finest of the stove kinds are—*campanulatum*, *hederaceum*, *orixense*, *sagittifolium*, and *trilobatum*.

LIME WATER.—*Novice.*—Put any quantity of lime into a tub of water, or other vessel. You need not fear making it too strong, as water will only hold a certain quantity in solution. Stir after mixing once or twice, and let it stand until clear before using. It will not prove injurious to the foliage of plants.

VINES IN HOUSES WITH OTHER PLANTS.—*Harry.*—It is by no means uncommon for vines to be successfully fruited in houses containing a general collection of plants, but it requires care and management. Your method of pruning will do, and the vines ought to give you a satisfactory crop this season. Carry a rod up each rafter, let them break at about fifty degrees, and syringe every day, taking care to keep the floor of the house as dry as possible, and to give air frequently, to prevent injury by damp to other things. If the roots are in the house they will be sufficiently active to maintain the progress above; but if out of doors they ought to be mulched over with litter, and protected from heavy cold rains by thatched hurdles; though, if the border is warm and well drained, a mulching with dung and leaves may be sufficient. Give as much moisture in the air by syringing as is consistent with the health of the other plants, which will now bear a moderate increase of heat and moisture without injury if they have plenty of light. Increase the heat gradually to sixty-five degrees, as the vines come into bloom; and to set them well, discontinue syringing, and keep the house close and warm till the berries are formed. This is the time when the general collection of plants is likely to suffer, and the chief source of any difficulty that may occur in fruiting vines with other plants. As soon as the berries are set, the syringe may be used again, to swell the berries and to keep down pests.

CAMELIAS.—*J. Clarke.*—Your straggling plants should be cut back at once, and, if you are right at the root, you will get new growth to make better-shaped plants of them. A good plan to furnish the lower stem is to graft or inarch the same or other sorts upon them, after which they should be kept warm and moist.

CYCLAMEN.—*Rosa.*—We fear your plants are not potted in the proper soil. If you have only used common garden soil, you must not expect bloom. They ought to be in a mixture of peat, leaf-mould, chopped turf, and sand; to be kept rather dry after flowering, have a shift into larger pots before being housed for the winter, and have plenty of water after the leaves are full grown until they have done flowering.

TIE FOR ZINC LABELS, ETC.—*Subscriber.*—The best material for attaching zinc labels is soft metallic wire, which you can obtain of any respectable ironmonger.

WALTONIAN CASE, ETC.—*Vita.*—Your two-light frame will be the best of all places to receive the newly-struck cuttings, etc., from the case. Take care that the little things are not burnt up by the sunshine. The most suitable material for your flue will be common bricks, well laid with hot lime and the usual proportion of sand. The bricks should be soaked in water before being laid, and the mortar used quite fresh.

PASSION FLOWER.—*Woodville.*—You have not managed your passion-flower right. It should be cut back very close every year in April, until it has been planted five years. At the last close pruning, cutting it to one-third its height will be sufficient. You had better cut close away the old shoots, and shorten the new ones to half their length; then train right and left along the top of the front glass, and next year cut them back to five feet from the former pruning, and so carry the rods along the main lines intended for them, by degrees, and cut back the shoots from them to two eyes every year afterwards, and always prune in April.

DEUTZIA GRACILIS.—*Corshalton.*—Grow in a mixture of turf and loam equal parts, and one-half part very rotten dung. They are sure to bloom well if the

wood is well-ripened in the autumn, and that is best accomplished by withholding water and letting them have plenty of sun.

ROSES.—*D. W. C.*—It is certainly too late to plant standards in the ordinary way, but, if extra care is taken, they may be planted any time this month, but the earlier the better. If you plant now let them be hard pruned, and kept liberally watered all the summer.

MOSSES IN A FERNERY.—*Isabella Bruce.*—Sandy peat, fragments of sandstone and limestone, rotten wood and broken bricks, are the materials on which mosses are most likely to flourish. The place should be shady, and should be watered with artificial showers all the summer. A rockery so treated will produce its own crop of mosses in time; the places where they show themselves should not be disturbed. Sphagnum is a moss that abounds in most boggy places, and generally grows in spots where it is covered with about two inches of water all the winter, in sappy unsafe ground. It is a grey moss, of coarse texture, very distinct in character, and when bitten between the teeth yields a bitter taste.

HOLLY.—*Rocklands.*—Your variegated holly should be pruned at once, but it will require great care. You should not have allowed it to go unpruned for so long, and it would not have become so open and naked. Take a view of the tree, so as to have in your mind exactly the sort of form you would wish it to grow to. First cut in every branch that extends beyond the general circumference, using a small sharp saw and a good knife. In cutting back the rambling branches, take them off, if possible, *above* a fork. By leaving two short snags of about an inch beyond the fork, you will get three breaks at least. In places where there are large openings between the branches, cut them back on each side about half their length, and let every cut be just above a cut or fork, as the holly has always dormant buds at the base of a fork. The hard wood must be cut with a fine saw, and smoothed over with a sharp knife. After pruning, syringe the tree frequently during dry weather, not morning and evening only, but any time whenever you can spare five minutes; but do not water the root at all.

COTTON PLANT.—*Amateur.*—The best cotton plant for ornamental purposes is *Gossypium hirsutum*, a biennial shrub which grows like a currant-bush and flowers profusely. Having raised the plants in a hot-bed, pot them singly in small pots in light rich soil, and re-place in the hot-bed. When they have filled the pots with roots, shift to thirty-two size pots, and plunge in heat again, keeping them at an average of sixty-five degrees—say, sixty degrees by night and seventy degrees by day. In June place them in a sunny greenhouse, and at the end of July shift to twenty-four or eighteen size pots, using equal parts of loam, rotten dung, and sharp sand. Winter them in the coolest part of the stove, and keep rather dry. While growing they require abundance of water.

ONION GRUB.—A correspondent writes as follows:—For many years past I have been sadly tormented by the onion grub. In some seasons they have destroyed my whole crop, but the two last seasons I have been quite free from them by using the following mixture:—To a barrowful of dry sawdust mix two quarts of coal tar; mix them thoroughly, so that the sawdust may be quite blackened by the coal tar, and have the appearance of soot. In the beginning of May I sow the above quantity over four beds, 30 feet long by 3½ feet broad. It is not at all injurious to the young onions. I suppose it is the smell of the coal tar that banishes the onion fly, as I have had fine healthy crops since using the above precaution.



POINSETTIA PULCHERRIMA.



THIS elegant stove plant, which flowers with large heads of bracts of the most brilliant crimson at the end of the shoots, ranging from four to twelve inches in diameter, is so easy of cultivation, that it should be grown by all who have the command of stove heat. It is cultivated largely by nurserymen for the London markets, and the method adopted by them for its cultivation is sufficiently simple as to be readily understood by any amateur. It is invaluable for decorative purposes, its elegant crowns of crimson bracts, mixed with ferns, palms, and other foliage plants, being wonderfully effective, showing well under artificial light; and as it flowers at a time when bloom is scarce, it renders assistance in the filling of vases and epergnes at a time of year when such methods of decoration are in request.

A stock of Poinsettias may easily be obtained, as from one nicely established plant several may be obtained, by striking cuttings in March or April, for which purpose the old plant should be started into growth at the end of February or the beginning of March, by being placed in a warm corner of the stove and moderately watered, when the new growth will soon appear. Cuttings of the new shoots of three or four joints are the best: these must be put in pans filled with sand, and placed in a heat of about 70°. A hot-bed prepared for cucumbers will answer very well, keeping them rather drier than cuttings in heat are generally kept, but do not let them flag, as they must receive no check from the first. When rooted, place them on the tank or in the hot-bed again.

A succession of cuttings may also be made in May, July, and August. The summer temperature should be 65° to 90°. For plants with single stems the cuttings should be gradually shifted on until they are put into six-inch pots, or if large specimens are required four or five cuttings may be placed at once into three-inch pots and then gradually repotted as more root space is required until they are in eight-inch pots. They should be shifted immediately the pots are filled with roots, until they receive their final shift, as becoming pot-bound in the earlier stages of their growth is most injurious to them. To grow them well they should be in a moist atmosphere and receive plenty of moisture at the roots. Dryness at the roots will almost invariably be followed by the falling of a large portion of the foliage. They do not require shade, and will bear a high temperature without injury, but abundance of air must be allowed them when exposed to the brilliant summer sunshine, or the leaves may be scorched. It is not advisable to strike the cuttings too early, as the young plants are apt to be drawn up and become leggy; but if struck too late, they may not bloom as early as required, which is usually about Christmas. A good compost for the cultivation of Poinsettias may be prepared by mixing well together equal parts of turfy loam, leaf-mould, fibrous peat, and silver sand, and the simplest plan of cultivation is to allow the plants to grow to their full height and flower as they please.

CULTIVATION OF THE EPACRIS.



THE close resemblance and near botanical relationship of the Epacrids to the Ericas, afford the key to their successful treatment. They are so far hardy that a close damp stove would soon be the death of all the species committed to it, and so far tender that exposure to burning sun or frost would be equally fatal. Moderate and gentle forcing they bear with patience, but they require at all times plenty of light and air, and must be guarded against stagnant moisture, and all sudden changes of temperature. In a greenhouse badly managed, the epacrises will be among the first plants to perish, but with thoughtful and constant attention they make a good return, and are exquisitely beautiful in their flowering season, and at other times neat and interesting shrubs. All the species and their varieties thrive in good peat alone, and require no other soil, with the exception of *E. microphylla*, *E. exserta*, and *E. andromediflora*, which do better in a compost consisting of one-third mellow hazelly loam, and the remainder sandy peat. As they all flower early in the year, and continue in bloom from January to July, it is necessary to give them every needful attention during the winter, as the flowering wood is then in process of advancement from a state of comparative rest to the development of blossoms, and any undue degree of cold or damp will render the flower buds abortive. The winter temperature should never exceed 50° , nor be lower than 40° , in order to keep the plants as nearly dormant as possible without injuring the flowering wood. As the season of flowering approaches, there will be no need of the aid of artificial heat to the extent of forcing, but a temperature of 60° to 70° is allowable, then plenty of air can be given, and the plants must then have plenty of water, and be scarcely at all shaded. As soon as flowering is over, cut back the plants moderately, and keep them rather close till new growth begins, which will follow close upon the pruning. They may now be treated in precisely the same way as camellias and azaleas when making their new wood, and as soon as the new shoots are an inch long, turn them out of their pots, remove a portion of the old soil without injuring the principal roots, and repot in the same pots or one size larger. After this operation shut them up for about ten days, and then give them plenty of air, and in about fifteen or twenty days after repotting place them out of doors in turf pits to finish their growth and ripen the wood for next season's bloom. If turned out without repotting, they frequently die or become unhealthy and unsightly, and if not properly prepared for turning out as we here advise, some similar disaster may occur, for the delicate roots of these plants are quite unfitted to bear any extremes, and it is for that reason we recommend turf pits, which are more uniformly moist and equable in temperature than any other kind of receptacle for plants in summer time out-of-doors. In any case the pots must be plunged to the rim; earth or ashes may suffice for plunging, but there is nothing to equal cocoa-nut fibre refuse for this purpose, as we have proved by experience. It is such a perfect non-conductor, that a mass of it is not soon affected by alternations

of temperature, and it is always uniformly moist without being over wet, unless the bed is made up on a surface of undrained clay, which, of course, is not to be taken into the reckoning when we are addressing sensible gardeners. Never let them get dust dry, never make them excessively wet, never let them be exposed to a burning sun, but treat them as nearly as possible as hardy plants, and let them enjoy all the summer sunshine and fresh breezes as you would the hardiest alpines, and house them for the winter early in the month of October.

Cuttings strike very slowly but surely, as with proper treatment not one in fifty need be lost. Cuttings, if made short, and of the extreme ends of half-ripe branches, will strike at any season, but the only safe season for beginners is the spring. The points of shoots should be removed for the purpose, and should be only an inch or an inch and a-half long. These cuttings, divested of their lowest leaves, are to be potted in pure silver sand. Cover the cuttings with bell-glasses, and place the pans in a cold pit, which is preferable to placing them on bottom-heat. When they have struck root, which may be known by the fresh growth of the points of the cuttings, pot in small pots, using sandy peat and placing them in a frame or pit, and as soon as they have again begun to grow, again remove them to the greenhouse, and there treat them as we have above directed for old plants.

It is of the utmost importance that the pots containing epacris should be well drained, and in potting extra care must be taken to pack the crocks so that there will be no fear of the soil washing down and stopping the drainage, for a water-logged condition will soon prove fatal to them. The soil should never be sifted, but broken with the hand to the size of walnuts, and with all the dust and grit added in filling in. In case of compulsory neglect in regard to potting, they may be shifted when taken into the greenhouse for the winter, but it is greatly preferable to repot them before turning out in summer. Take care in potting to merely loosen the roots with the hand so as to remove a little of the old soil without distressing the roots, but never cut the roots with a knife except in some extreme case, and then cautiously.

GARDENING IN AUSTRALIA.

THE MELBOURNE BOTANIC GARDENS.



R. W. R. GUILFOYLE, the energetic manager of the Melbourne Botanic Gardens, has sent us his third Annual Report, from which we make the following interesting extracts:—

“ One of the principal features in my original design was the creation throughout the Gardens of spacious lawns, in some cases occupying places where formal and narrow walks existed; thus giving to suitable places a park-like appearance, and affording a bright and elastic turf, over which the visitors could roam at

pleasure. In accordance with this plan, about 3500 yards of walks have been obliterated; while 2600 yards of curvilinear walks have been made in the Botanic Gardens. While the introduction of broad lawns give infinite beauty to the landscape, it also renders easy the task of keeping the area so treated in good order. The new lawns which have been formed in the Botanic Gardens are kept in thorough order by a one-horse machine, attended by one man; and the work is efficiently done in this manner, whereas a garden cut up with innumerable straight paths, with narrow borders and mean edgings, requires continual attention, and a far greater amount of labour. To obviate this as far as possible, I have adopted the system of broad grass edgings, which maintain a regular, smooth appearance at a minimum cost of labour. The high opinions I expressed in my two previous annual reports respecting the Buffalo grass as being a splendid grass for lawns, has been practically demonstrated in these Gardens. It is also a very valuable grass for resisting the encroachment of sand on the coast, besides possessing other admirable qualities.

“Trees numbering 682, and averaging in height from 7 to 35 feet, were removed to the new lawns from the thickets bordering the old paths, and only five of the number died—an acacia, two *Pittosporums*, a *Pinus insignis*, and a *Grevillea robusta*—all of which are plentifully represented in the Gardens. The trees thus removed are doing well, and successfully withstood the two months' excessively hot weather at the close of the summer.

“A lawn of several acres in extent, planted with Buffalo grass, has been formed on a space sloping down to the Botanic Gardens lake. It includes portions formerly occupied by the emu pens and monkey cages, and a part divided into segments by eight walks, three of which were parallel a few yards from each other. The Palms, Cycads, Bamboos, Pampas grass, *Arundo*, *Yuccas*, *Agaves*, *Cordylines*, *Dracænas*, &c., which have also been planted singly and in groups on this lawn, give a general tropical effect, creating a variety of striking views from different points of observation. Two large specimens of *Jubæa spectabilis* (a hardy palm of great beauty) were brought from the grounds of the late Hon. M. O'Grady, and planted on this lawn. Top-dressing was found necessary during the summer on account of the hard, clayey nature of the soil, especially in those places where the former pathways led down to the lake, and across the spot where the fern gully now exists. A rustic summer-house with thatched roof has been erected near the rockery. The wood of which this house is built was obtained from the wattle scrub on the Yarra bank. It presents a neat and appropriate appearance, and will be supplied with water for drinking purposes—a matter which requires attention throughout the Gardens, before the summer sets in. At the bridge crossing the lagoon a tap and ladle have been temporarily placed, supplied with drinking water, by a syphon from one of the tanks of rain water at the Director's house.

“Of course, in lawn making it is always advisable to first of all thoroughly drain the place. If the lawn is an extensive one, and trenching is considered too expensive, the ground should be sub-soil

ploughed, harrowed, levelled, raked, and thickly sown with the mixed lawn grasses usually sold by the nurserymen here, a little clover being added; and in the spring the spade should be stuck in at regular distances, and rooted pieces of the Buffalo and Doub grasses (*Stenotaphrum glabrum* and *Cynodon dactylon*) planted. These after a short time will meet, giving, with the English grasses, both a summer and a winter lawn. In summer the Buffalo and Doub grasses are sure to be green. If the soil is naturally poor, top-dressing after the first year with street sweepings, mixed with a sandy soil or friable loam, will be found of value in increasing the strength of the sward. The correctness of this theory I have practically demonstrated, as may be seen in the Gardens at the present time. One lawn only was formed entirely of Buffalo grass; but to neutralize its rather brown tint during severe frosts, I had it top-dressed, and scattered over it a slight sowing of the English mixture of lawn grass seeds.

“I may here point out that a place laid out in the form which I am giving to the Botanic Gardens will be easily kept in order after a year or two. Grass lawns can be mown by a machine. The three large lawns lately made in the Gardens, as I have previously stated, can be attended to and kept in order by the labour of one man and a horse; and they could go over a much greater space in a week; whereas numerous borders of flowers, with walks occupying the same space, would necessitate a vast amount of labour and expense. Nor can anything in the way of extensive gardening be more beautiful than a succession of verdant lawns, broken by graceful groups of diversified foliage and effectively arranged floral bloom. Even the highest and most important feature in a Botanic Garden—the collection and scientific arrangement of plants—can be advantageously carried out in this manner, thus combining the useful with the ornamental, and gratifying the taste of lovers of the picturesque and beautiful, while facilitating the researches of the botanical student.

“The white gravel formerly in use for paths in the Botanical Gardens was objectionable, not only from its glare, but from the fact of its remaining disintegrated and absorbing much water during wet weather, thus becoming sloppy and heavy. With the view of remedying this defect, I endeavoured to discover a gravel bed in the Gardens which might be utilized in forming the new paths; and after three attempts in sinking holes for this purpose, fortunately discovered a bed of fine orange-coloured gravel, which has been freely used in constructing the new walks in the Gardens. This gravel, after a time, becomes as hard as cement, and makes a firm, dry footway, while its colour harmonizes most agreeably with the surrounding vegetation.

“The lake in the Botanical Gardens has been kept thoroughly clear of weeds by the T-shaped machine, armed with scythe-blades, which I designed, and which was described in my last annual report. The clear sheet of water now takes its proper place as one of the salient points in the landscape; and when the remodelling of the Gardens is complete, will prove a most important and attractive feature in the views to be obtained from various points. During the

intensely hot weather, when the lake was nearly dry, advantage was taken of the opportunity to obtain a large quantity of manure from it, for general use in the Gardens. The bottom of this lake contains a deposit of rich manure, decayed vegetation having been continually conveyed into it, down the slopes, which are drained by it; and it would be very advisable, on a fitting occasion, to deepen the lake, when enough soil of a rich description would be obtained to lighten the low ground at its head. Rhododendrons, Magnolias, Azaleas, etc., would look well on the islands which stud this lake; and it is my intention to plant a few there this season.

"The swans and wild fowl are doing well. Of the cygnets hatched last year, two only remain, one having been shot by some evil-disposed person. The swans caused much trouble during the summer season, by going over the bank into the Yarra, travelling miles up the river; now, however, that the iron boundary fence of the Gardens has been erected along the bank of the Yarra, the swans are shut in, while the Gardens are protected from the rough characters who usually infested them, especially on Sundays, coming up the river in boats and idling about on the bank.

"The sloping bank to the lake where the experimental Garden now exists, and at present clothed from end to end with Willows, Fraxinus, Ulmus, Aloes, Ricinus, Cypress, Pinus, etc., etc., has straight paths running down to the lake. This part of the grounds could be transformed into a most picturesque spot, and various orders arranged in groups. The Amaryllidæ have been grouped near the band-stand, on the Palm-house lawn; near this the Liliacæ will be arranged a little lower down, and nearer again to the lake the Iridacæ. The Liliacæ, Cordylines, Dracænas, and Yuccas, will be beautiful objects with Ripogonums, and other climbing plants of the tribe, planted at their stems. They would tower far above the Aloes, Phormium (or New Zealand flax), Ruscus, Arthropodium, Astelia, Dianella, Ornithogalum, and Hyacinth, etc., and altogether form an interesting collection for the student of botany.

"The proper drainage, and reticulation of the water supply from the Yarra, is a most important matter, not only with respect to Government house grounds, but the Botanic Gardens also. The poor character of the soil in many places necessitates it. The banks of the new reservoir in the Botanic Gardens (which has been estimated to be capable of supplying 350,000 gallons twice a day) have been planted with Buffalo grass. This reservoir will be of very great service; it will be kept filled by an engine of great power substituted for the 6 H.P. one at present in use. In seasons of drought its value will be immense. The engine will draw the supply from the Yarra, the water of which is, however, only fit for gardening purposes, there being no supply of Yan Yean in the place, the latter having been cut off before I took office. The residents in the Gardens occasionally contrive to secure a little rain water from their houses; but when that fails, they are forced to use the polluted water from the Yarra. In such extensive Gardens, the resort of thousands, especially during the summer season, there should be an abundant supply of drinking water for visitors; and I trust that

some provision will be made before the summer sets in to supply this great want, as also to provide drinking fountains throughout the grounds. A few rustic seats round large trees on the lawns and elsewhere, have been provided during the past year under my directions, and these should be materially added to. The overflow from the new reservoir can be utilized in supplying small lakes below it. This portion of the Gardens when completed will prove a very striking spot. The contract for a portion of the new Conservatory has been commenced. The old one is in such a dilapidated condition, that it would not be a surprising matter to find it blown down some windy night.

"In the triangular piece formed by the entrance from Anderson Street, a natural system of plants will be commenced at once. With respect to the entrances to the Gardens generally, it would be a great improvement to remove the present unsightly gardeners' residences scattered throughout the grounds, and substitute lodges at the various entrances.

"The Fern Gully in the Botanic Gardens is now one of the great attractions in the grounds, and it has quite fulfilled the expectations I expressed concerning it in my first report. The large ferns have flourished, and now spread their cool green fronds over the small species growing beneath their shade. The aspect of the place is quite a natural one, as it should be; and while the shelter trees transplanted there afford the requisite shade, it has been freely planted with stag-horn and elk-horn ferns, which give increased beauty and appropriateness to the spot. A number of tall tree ferns from Mount Macedon have been planted here, and are growing vigorously.

"The number of visitors to the Gardens during the past year has been exceedingly great. The "Southern District" brass band performs every alternate Saturday in the grounds, in fine weather. It is gratifying to find that the Gardens are so extensively visited by the public, and that the lawns and other improvements made are generally appreciated.

"During the past season a good display of flowers was kept up throughout the Botanic Gardens until the drought set in. I am most anxious to form a good Rosery in these Gardens. Though there are some magnificent collections of the "Queen of Flowers" around Melbourne, I have not seen a Rosery on a thoroughly grand scale in the colonies; and the Melbourne Gardens should certainly not be deficient of this beautiful feature. I have already secured a superb collection of Camellias, which are doing exceedingly well. I have also a fine collection of Azaleas, but Rhododendrons and Roses are very deficient. The former will be required, amongst other things, for planting on the islands in the lake, while the necessity for a Rosery is at once apparent. Properly formed, such a feature in the Gardens would be one of surpassing interest, and would alone afford immense gratification to the public during the season when these beautiful flowers are in bloom, while the contrast of colour by effective grouping would create magnificently harmonious and pleasing nature-pictures."



CROTON ATROPURPUREUS.

CROTON APPENDICULATUS.



CROTON APPENDICULATUS is remarkable for the peculiar formation of its leaves and elegance of outline, and is desirable for its interesting appearance and the contrast it affords when arranged with those of bold habit, and having richly-coloured foliage. The form is of neat growth, and the leaves, which are of the deepest green, are narrow, and in the case of well-developed examples depend in the most graceful manner possible. It is a charming plant for the dinner-table and drawing-room, and will not fail to secure a fair share of appreciation. It was introduced to this country by Messrs. J. Veitch and Sons.

WINDOW GARDENING.

BY JOHN R. MOLLISON.

(Continued from page 103.)

INSECTS: THEIR PREVENTION AND CURE.



THE insect which most generally attacks plants is a kind of aphid, commonly called the greenfly. It becomes quite a plague on plants if allowed to increase, which it does at a most astonishing rate. If left to themselves they would soon bring your plants to a most disreputable condition, ultimately killing them outright. They are always worst on soft-wooded plants, such as calceolarias, cinerarias, pelargoniums, etc. A healthy robust growing plant is not so liable to be attacked as a sickly one. A sickly plant is their great delight. They feed on the underside of the leaves like a flock of miniature sheep, and cluster around the tender shoots and flower-buds with the most persistent greediness, causing the leaves to curl up and turn yellow, and the tender shoots and flower-buds to grow deformed and crooked, arresting their growth and expansion. Thus you see greenfly is an enemy you must give no quarter to. Hunt them down and destroy them whenever they make their appearance. Do not kill them on the leaf if you can help it. With a little brush or a feather you will be able to sweep them off into your hand, or anywhere where you can destroy them.

Tobacco smoke is the surest and best thing to kill them. If you have a window greenhouse you can easily manage this by shutting it close after sundown and filling it with tobacco smoke. All plants in bloom that have no fly on them should first be removed, not to let the smoke damage their bloom. For the operation you will need a tin canister with several holes punched through the bottom, a handful of tobacco paper, and a red hot cinder. You will always be able to get an old canister. Tobacco paper you can purchase at one shilling and sixpence per pound, from any nursery man or seedsman. Half a

pound will do for several applications. Tease out the paper and put a small handful above the red cinder in the canister, and place it inside the greenhouse on the edges of two small pots to cause a draught, and shut it up close. When the house is quite full so that you can hardly see the plants, take out the canister quickly and keep the greenhouse shut for nearly half an hour; then open it and let out the smoke, and the deed is done. After the smoke is all out, take the plants to the door and give them a good syringing to remove the dead and dying insects. Take care not to overdo it in smoking plants, as you might burn them; better do it moderately and repeat it than overdo it once.

If you have only one or two plants infested, the best plan is to have a large paper bag big enough to cover the plant entirely and close enough down so that a handful or two of soil may be put round the bottom to keep it close; this with one of the corners torn off makes an excellent smoking apparatus, and you need only to puff the smoke from your pipe in at the corner till the bag is full. Keep the corner shut with your fingers, or pin it close for some time, and then let the smoke escape by the corner.

Two other insects, a small red spider and a longish grey insect called thrip, are very bad on plants. Treating them the same way with tobacco smoke, and washing the plants well, will exterminate them quickly. They are as great a plague as greenfly when allowed to increase.

There are three other insects which may trouble you sometimes, called brown-scale, white-scale, and mealy-bug. It is just a chance if ever you are troubled with them. Brown and white-scale stick close to the stems, giving them a spotted appearance. Mealy-bug looks like a small patch of down sticking in the axil of the leaves; it is a small yellowish grey insect, much like a bug in shape with a soft white downy substance wrapped round it. Hard-wooded plants only are infested with scale. Mealy-bug attacks hard and soft wooded plants alike. A sponge and soap-and-water is the best cure for them.

You may likely be troubled with slugs. They crawl over the plants leaving their slimy paths, and nibbling at the leaves and tender shoots, often causing great destruction. If you find their traces about your plants hunt for them with a candle at night among the leaves and pots; you are sure to get them then if they are there, as they come out during night to feed.

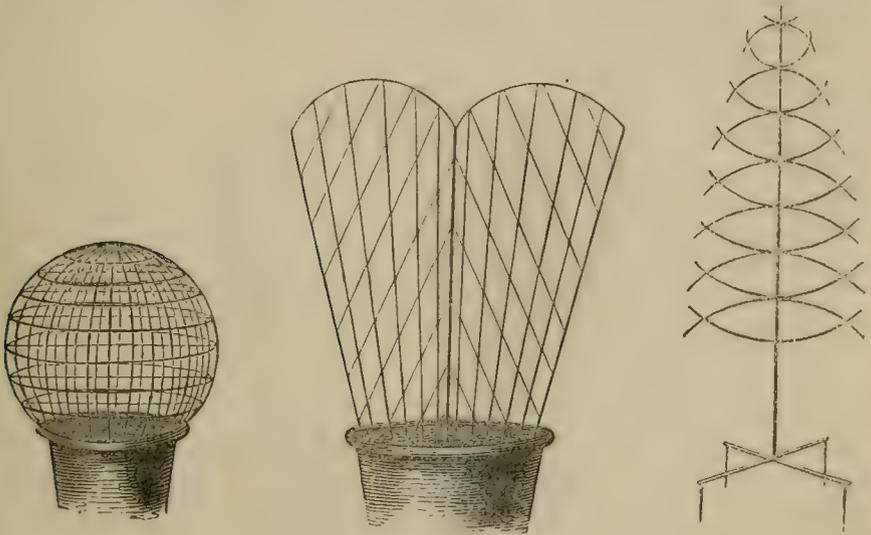
I hope you will understand how to manage your plants now if infested with insects. But remember, plants, when kept clean and in good health, are scarcely ever troubled with insect pests.

PROPAGATING AND TRAINING OF PLANTS.

To have some knowledge of the training and propagating of plants is very necessary. A few simple rules are all that you require, as taste and circumstances must guide you a great deal in this matter. Plants of a slender growth such as fuchsias, pelargoniums, petunias, etc., should be staked with neat wooden stakes painted green. When

staking, keep the stakes behind the plant or branches to keep them out of sight a little. A pot of annuals, such as mignonette, may have four small stakes round the pot at equal distances, and small twine looped round them to keep the plants up. Primulas or Chinese primroses, having slender necks, should have three little pins round their necks to keep them steady. Calceolarias will require every flowering branch staked to make handsome specimens, but four stakes the same as recommended for mignonette will do. Hyacinths and tulips are better staked with wire than wooden stakes, as it does not look so clumsy for such beautiful flowers.

Plants of a trailing habit, such as clematis, petunias, tropæolums, ivy-leaved geraniums, and many others, always look best trained over wire globes or trellis-work, as represented by the figures below. Ivy-leaved geraniums especially make a beautiful window-screen when grown in a box in your window and trained over an ornamental wire



WIRE PLANT TRAINERS.

trellis fixed firmly to the box. Try this, and you will find what a pretty window screen it makes.

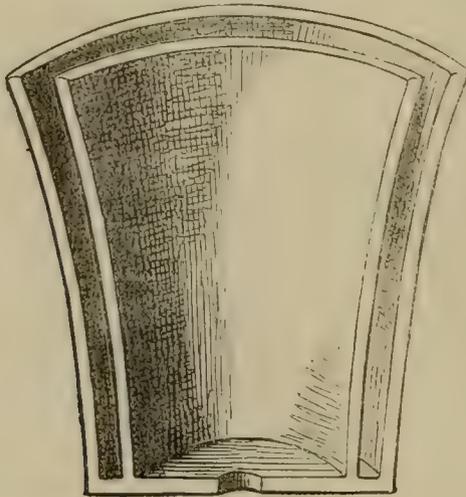
To keep your plants in shape, if a strong shoot threatens to spoil the outline of your specimen, pinch the point off and it will throw out side-shoots to keep the proper shape. Young plants of geraniums, fuchsias, etc., that you want to branch out and make bushy specimens, must have their leading shoots treated in the same way.

You can make very nice flower stakes out of common laths, but I think it would be far better to purchase them from a seedsman ready made. You can get them from ninepence to three shillings per 100, according to lengths of from one foot to three and a half feet. A bundle of 100 would last you for years, and they are always at hand when required.

Staking plants should be done neatly, and room enough left in tying for the stems to swell. If it is a quick-growing plant, leave the

stake considerably longer than the shoot to tie it up as it grows. A fuchsia, for instance, always looks best if trained as one leading shoot, with only one stake in the middle of the pot. Any weak or lengthy side-shoots can be looped to the stake. This rule holds good for most plants if you wish your plant to be pyramidal in shape. The secret of neat effective staking, is to stake your plants properly with as few stakes as you can, not to have your pot full of unsightly stakes with little foliage to hide them. Supposing you have a plant with a good many shoots or branches, in staking that plant contrive if you can to have the tallest shoot in the centre and the smaller ones outside, and all equally round, so that it may be as well balanced on all sides as you possibly can make it.

The propagation of flowering plants is a very simple thing. A cutting when properly made and inserted in the soil only requires you to have a little patience till it roots, and to be left alone in the soil till then; not pulled up now and then to see if it is rooted, as many will do. The same may be said regarding your seeds after they are



DOUBLE FLOWER-POT FOR STRIKING CUTTINGS.

sown; let them alone in peace; they will be showing their little heads above ground by and by; they do not like being disturbed till then. To enable you to raise your own plants I will say a few words on propagation. It is but reasonable to think you will have a greater pride in a plant that you have raised yourself from a cutting or a seed than one you may purchase ready to your hand. Plants are propagated from cuttings, seeds, and division. Geraniums and fuchsias, for instance, are very easily raised from cuttings in this way. Select a strong healthy shoot, cut away the lower leaves, then with a very sharp knife cut it cleanly through, beneath an eye or joint, and insert it with a dibber in the cutting pot, about an inch and a half deep. Calceolarias are easily raised by taking off side-shoots by a joint, cutting off the lower pair of leaves, and inserting the slips up

to the first joint. In taking cuttings it is a rule either to slip them off at a joint with the joint or heel on, or, taking a part of a branch or shoot and cutting it clean across below an eye or bud. The reason for this is that a cutting roots far quicker and surer at a joint, or beneath an eye, than it would do at any other part of the stem. The sap or life-blood of a plant rises between the bark and the wood. When a cutting is taken off, the sore part of the wound inflicted must of course be where the flow of the life current has been stopped; so it is naturally there where it heals up first and the root appears. A cutting when it shows signs of rooting, *calices* or heals up round the inside of the bark, much in the same way as you will see a tree heal over where a branch has been cut off. Directly after calicing has taken place the little rootlets make their appearance as little round knobs, which soon lengthen out searching for food to sustain the returning energies of the cutting, which is now entitled to the dignified name of a plant.

Cinerarias, musk plants, forget-me-nots, primroses, and other plants that throw out leaves or shoots direct from the crown of the root, can be easily propagated by division; that is, cutting them up into parts and potting the parts separately. Mosses or selaginellas are propagated by inserting several ends or pieces over the surface of the pot or pan that you intend for a specimen plant. Ferns in most varieties are propagated by division, those with creeping stems or rhizomes by simply cutting off a part and potting it; and others that form a crown by cutting clean through the ball and crown and separating it. When inserting a cutting make a hole with a dibber and fill up the hole round the cutting with sand, which will prevent them much from damping away at the stem.

Annuals, such as stocks, asters, mignonette, candytuft, etc., are all raised from seed. All flowers that spring, grow, flower, and die all in one season, are called annuals; biennials live and flower for two seasons or more. You have therefore to raise new plants of annuals every year, and can always have a change from one kind to another. And besides, they are very interesting, as you have the whole duration of their existence under your notice, from the germinating of the seed till they flower out and die. Their life is short indeed, but how lovely they are when in the height of their beauty.

A great many people err in sowing their seed too deep, and are therefore disappointed in the result. Too-deep sown seeds are smothered. Never sow them much deeper than an eighth of an inch. Seeds vary much in size, and the depth of sowing must vary accordingly. Scarlet runners, nasturtiums, and sweet peas may be sown a quarter of an inch deep; stocks, asters, mignonette, candytuft, etc., just covered and no more. Very small seeds, such as *calceolarias* and *lobelias*, should be sown on a fine smooth sandy surface, not covered, kept damp, and have a bit of glass placed over the pot to keep the cold draughty air off. Always shade your seed pots or pans from the sun, for it would soon dry them up, and destroy the germinating power of seeds; a piece of brown paper tacked down over them till they are up will do very well. When you are going to fill a pot to sow seed in, give it good drainage and shake the soil down

level in the pot; then sow your seeds on the surface, and with a flat piece of wood gently press the seed and soil level, then scatter some finely sifted soil loosely over it. Water with a fine rose, taking great care not to wash the seeds up or disturb them. Never let the seed pots get dry, and after the seeds are up take good care to wet the seedlings as little as you can as long as they are in their seed leaves; in case they damp away, contrive to water round the edge of the pot or box and in open spaces through. You can easily give all your different kinds of seeds their proper depth in your window-box, and shade them till they are up.

You will find it a delightful and interesting pastime, raising your own plants either from cuttings or seeds, and you will have a far greater interest in them, knowing them thus from their very infancy. I explained in a former paper how to treat your seedlings after they are up to ensure a good display. Your cuttings, as soon as they are nicely rooted, should be potted with good potting soil into five or six inch pots, where they will grow very quickly into nice little specimen plants.

THE ORANGE TREE.



AS the season is now advancing, it may be interesting to some of your readers to know that this is the best time of the year to shift orange trees, they having been pruned in some three weeks or a month back, also having received a good soaking in tepid water. The soil I use is two parts of the top spit of a good rich loam, which has lain in a heap for six or twelve months, and turned once or twice in the winter season—one part leaf-mould, a little rotten cow-dung, with a sufficient quantity of silver-sand and road grit to keep the soil open and porous, being well broken with the spade, but not shifted, unless rubbed through a coarse sieve. Let the pots or boxes be well drained, placing a little moss over the drainage to prevent the soil mixing with it. In shifting the trees let the soil be pretty firmly pressed about the roots, not using the soil too dry or too wet. I am no advocate to sluice the water into the new-potted trees as soon as the potting is completed, but let them get moderately dry, and then give them a good soaking. They ought to be placed in a temperature of between 50° and 60° until they have made their growth, which will be by the end of May; then let them have more air, as no more fire-heat will be required after this time, giving a good soaking of water as they may require it, occasionally with weak liquid manure, and syringing them every fine evening. I do not prefer placing the trees out-of-doors, unless it is in a very favourable or sheltered situation, screened from the raid-day sun, until the latter end of August, which then ripens the wood, and the rains which wash the foliage benefits the trees much. Take them into the house again the last week in September, and give them very little water until the latter end of March.

THE CULTIVATION OF THE ACHIMENES.



HERE are few plants more beautiful, or that will better reward the cultivator for an extra attention, than the different species and varieties of Achimenes. I have had fine specimens of the grandiflora in bloom for six weeks, and they look as if they would continue to bloom in fine condition for as much longer. The longiflora, though not so fine with me as I have seen with other cultivators, has also been beautifully in flower, whilst hirsuta and pedunculata—the latter in its bloom little inferior to picta—are just showing their flower-buds. One advantage which picta possesses over the other is, that it will grow and flower more freely in the winter months when placed in a stove temperature, but then, all the others will flourish for a longer period in a greenhouse temperature. One of their great recommendations to amateurs of limited means, and to persons who, like myself, are required to make a great floral display in summer and autumn, with but limited means for keeping up a stock during the winter, is, that during the cold months of the year, as soon as done flowering, they require no attention more than keeping the roots dry and free from frost. My plan with them, as well as Gloxinias, and several of the Gesneras, is merely to lay the pots on their broadsides, and pile them up in brick fashion in any snug corner below a stage. The Achimenes will stand a greater degree of cold with impunity than the Gloxinias will do, unless the roots of the latter are very dry, when they are apt to become so much shrivelled as to impair their future luxuriance. To preserve them safely neither of them should be exposed to a lower temperature than 35° , and if 40° is made the minimum, so much the better. The roots will keep better in the pots in which they were previously growing, than if taken out and put away in drawers, etc. The soil I use is equal parts of turfy loam and turfy peat, with an addition of about one-sixth part of silver-sand, rotten dung, and lumps of charcoal, in equal proportions, using more charcoal if the soil is not lumpy and full of fibre. It is a matter of little consequence whether they are grown in pans or pots, for though the roots are inclined to run shallow, I have found them at the bottom of the largest pots. Whether pots or shallow pans are used, there should be no deficiency of drainage. To keep up a succession of bloom as long as possible, succession tubers should be excited in February, April, and the end of June, or any time between these periods. If excited later they will be of small service to the amateur who has got nothing but his greenhouse, frame, or pit. There will be no difficulty in exciting any of them, except the first lot, and that difficulty will not exist with the amateur if he has a pit heated by any means except dung, for his early melons and cucumbers. For accomplishing that object the scaly tubers should be taken out of the pots, and placed, with a little earth about them, into small shallow pans, and at once transferred to a situation commanding a temperature of 60° or 70° , with abundance of atmospheric moisture. This can be as easily effected

in a dung-bed frame as anywhere else, with this difference, that after the plants have sprung, and after they are potted and commence growing, the frame must have a little air night and day, and in bright weather the plants would require shading, or the action of the sun on the leaves of the young plants, when covered with the dense vapour arising from the dung-beds, will mark them with brown blotches, which will mar their beauty, however well they may grow afterwards. In moving the plants from the pans in which they were excited (which should be done when the plants are an inch or two high), they may be transferred into small pots, to be again shifted, or they may be put into their flowering pots at once, which is the method I prefer. In doing so, some cultivators place the requisite number of tubers at regular distances over the pot; but in general, and especially with such sorts as *pedunculata*, *grandiflora*, *hirsuta*, etc., I prefer bringing all the growing ends of the tubers to the centre of the pot, and placing the other ends in a line to the circumference, like the spokes of a wheel, so that the specimen may resemble a single plant, and not a pot full of snakes. The same plan may be adopted whether one, three, five, seven, or more tubers are employed. When thus potted they must be again placed in heat, and hardened off by degrees to the temperature of the greenhouse. All of them are grateful for a little shade, the leaves being more healthy, and the flowers brighter and hanging longer. A late vinery, where little or no heat is given, or a greenhouse with either vine or creepers up the rafters, is just the place for them. In a glass case, which could be shaded, but where no fire-heat could be applied, I have seen them beautifully in bloom until very cold weather set in during November.

Altogether they require no more, if as much, labour to grow as balsams that are fit to be seen; while, without detracting from the beauty of the latter, the *Achimenes* cannot be charged with the constant litter that the drooping of the flowers of balsams occasions. If fly makes any appearance on the leaves, smoke with tobacco, moderately and frequently rather than much at a time, and syringe the following evening with clear soot water. The fly which attacks some of them is bad to get rid of, and to kill them in one dose would probably be an overdose for the healthy vitality of the plants.

HEAT OF PLANTS.



E are aware that warm-blooded animals have the power of keeping up a certain temperature within them, which varies at certain stages of their growth, and perhaps periodically. This result is obtained by respiration—the oxygen of the atmosphere uniting with the carbon of their blood, and producing a species of combustion. The more fresh air we breathe, the greater the heat of our bodies, so long as we take proper food to afford the carbon. A similar, though less understood, phenomenon seems to take place in the respiration of plants.

Heat is always disengaged when gaseous products are liberated;

and as vegetables respire, however slowly, a certain degree of heat must be produced during that process. In germination, heat is sensibly evolved; a piece of ice placed on a growing leaf-bud dissolves, when it would remain unchanged in the open air; and experiment has proved that the surface of growing plants is three or four degrees higher than the surrounding medium.

Again, the internal temperature of a large trunk is always higher than the surrounding atmosphere; and though young shoots are sometimes frozen through, the general structure of the wood and bark is such as to conduct heat so slowly, that the internal warmth is never reduced beyond what seems necessary to vitality. During germination this heat is most perceptible; and though it be rapidly dissipated by the extent of surface exposed to the air, 100° have been noted during matting, and 87° in the flower of a geranium when the atmosphere was only at 81° .

THE USES OF THE GARDEN FRAME.

(Continued from page 116.)

THE GARDEN FRAME AS A PROPAGATING BED.



NOT the least important application of the garden frame, for the purposes of utility and decoration, is that of forming a bed in which to propagate a stock of plants for bedding out in the flower borders at the commencement of the ensuing summer. Apart from the pleasing results which are obtained from a propagating bed, there is a great deal that is interesting and instructive in the process of propagation itself; it is one of the most wonderful provisions of the Creator that there should be so many various means of increasing and distributing the greater part of plants, which, unlike the animal creation, are destitute of locomotion and consequently have less power in themselves of extending their species. It is therefore in this mode of using the garden frame that the amateur horticulturist will in all probability derive the greatest amount of gratification.

By about the beginning of July the cucumbers will furnish a good supply of fruit, which at this season will have become so common, that it will not be necessary to continue to occupy the frame with them. The balsams, cockscombs, tomatoes, and all the other tender plants of which we have already treated, will now be planted out in the open ground; the annuals which occupied the exterior of the bed will also have been removed to their several permanent situations, and, above all, the heat in the bed will in all probability be exhausted; so far as concerns the old bed, therefore, it will be of little use for the object we have in view; the frame must therefore be removed from the old bed, and so far as regards the cucumbers that are left, the natural temperature of the season will be sufficient to bring them to maturity. There must then be a new bed formed, and as we have given instructions on this subject

already, we refer our readers for information on this point to the first section of the second division of this essay, where ample instructions are given how to raise a hotbed. It will not be necessary, however, to have one of such a height for propagation as was used for forcing; for besides the lesser amount of heat required for the former, the season will also contribute considerably in this respect, indeed a gentle bottom-heat is all that is requisite. Having prepared the dung as before, erect a bed, say about three feet in height, and treat it in every respect as was recommended in the first instance, lift on the frame, and the bed is ready for use. It will not be necessary on this occasion to make the bed so much larger than the frame, as at this season the exterior margin will not be in such requisition as it was in the spring; the whole dimensions of the bed must not therefore be above ten or twelve inches wider than the frame all round.

Before proceeding to treat of the different plants which are intended to be propagated, we shall devote our attention for a little to the subject of propagation generally, and more especially to the way of making cuttings. The first object to be gained is to procure a number of *clean* flower-pots, five inches wide at the top; another matter of importance is to procure some fine, sandy, turfy loam, sandy peat, and leaf-mould, and also half a bushel of fine, sharp, gritty, silver sand. The compost which will be found suitable for the generality of plants will be one-third of the loam, a third of the peat, and a third of leaf-mould, and the whole made sufficiently open and porous with a due proportion of the silver sand. These should be placed upon a bench and well incorporated; the loam and peat chopped up with all the turf together in one mass. Procure also a quantity of potsberds, of which the gardener has generally more than he requires; place one large piece over the hole in the pot, and fill up with them to about an inch in thickness; then place a layer of moss about another inch in thickness, over which fill the pot with the compost to within about one inch of the surface, to which fill up with the silver sand. Let the pots be now watered with a pot having a very fine rose, for the purpose of consolidating the sand; the pots will then be ready for the cuttings.

We shall now turn our attention to the mode of making the cuttings; but as this varies according to the plant that it is intended to propagate, we shall confine our remarks for the present to cuttings generally, leaving any peculiarities to be treated of when we notice the plants themselves. The best and the only wood for making cuttings is the extremities of the growing shoots. These when taken from the plant should have at least four joints to them; but if the shoot is long and tender, it may be taken off of such a length as to supply in some cases two or even three cuttings. We shall suppose, however, for the sake of illustration, that the extremity of a shoot with four joints has been selected for the purpose of making a cutting; the first thing to be done is to remove the two lower leaves, which are situated at the lowest joint (in some plants there is but one leaf), leaving only about the sixteenth part of an inch of the leaf-stalk remaining. Then cut off the tip just under the topmost joint, there will then be only three joints left, the lowest and the two

upper ones, on the latter of which the leaves must be allowed to remain. We have sometimes seen propagators who were very fond of mutilating the leaves which are preserved on the cutting, by shortening them to one-half their length, but for what object or upon what physiological principle we could never yet divine; suffice it to say it is a most barbarous practice, and is most injurious to the success of the operation. The cutting being thus prepared, the operator should provide himself with a small dibber, which is generally made of a piece of common wood, varying from the thickness of an ordinary black-lead pencil to that of the forefinger, according to the thickness of the cuttings which are being planted. All small cuttings should not be planted deeper than half an inch, for the shallower they are planted, and the nearer to the edge of the pot they are, the sooner will they take root. The number of cuttings to be put in a pot must be regulated by the habit and strength of the plant. When the cuttings are planted they should be well watered and covered with a bell-glass or any old crystal covering, such as broken decanters, disabled tumblers, or other such outcasts from the china closet: such is the general management of cuttings. But we shall now make a few observations on the various plants which the amateur gardener is likely to have under his management; we shall not, however, launch out in too wide a field, for this is a subject to which there exists no bounds. The operations, however, of our readers being as limited as their space, and in many instances their time also, we shall only consider here such plants as are requisite for *bedding out*, and furnishing the flower borders during the summer and autumn months. We shall suppose, then, that the flower borders are this season all well furnished with fine, healthy, free-growing plants of the following: Heliotropes, Fuchsias, Pelargoniums, Scarlet Geraniums, Verbenas, Cinerarias, etc. etc., and that it is intended to raise a young stock to preserve for bedding out next season, to present to a friend, to furnish amusement, or for all three purposes.

The Heliotrope.—This is what is popularly termed *Cherry-pie*, and, whether as a greenhouse plant or for bedding, is a universal favourite. When grown in good soil which is well charged with rotten dung, it makes a very free and luxuriant growth, supplying during the whole of the summer and autumn a profusion of its gay and odoriferous blossoms. In the month of August choose the terminal shoots of some of the most luxuriant plants, and prepare the cuttings as we have directed above, that is, by cutting close under a joint. Let them be planted in the pot and placed in the frame, but it will not be necessary to cover them with a bell-glass. In the course of two or three weeks, the cuttings will not only have rooted, but made considerable shoots; they must then be potted off into single pots, filled with a compost of loam, sandy peat, and well-decomposed stable manure; for this purpose a part of the old dung bed on which the frame was formerly placed will be found of great utility. As the plants fill these pots with roots they must be shifted on into a size larger, in which they may remain during the winter; when they have got this last shift they must be gradually hardened off, to prepare them to endure the vicissitudes of the ensuing winter.

In the spring following, the plants which have survived the winter should be turned out of the pots, the balls cleared of worms, and repotted into fresh soil; they should also be shortened in, so as to make them bushy. In the month of May or June they may be planted out in the flower beds, and as they increase in size they may be pegged down in a horizontal position on the surface of the soil, in the same way as *Verbenas* generally are.

Fuchsias.—The same instructions that are given for the *Heliotrope* are also applicable to the *Fuchsia*; but the best shoots of which to make cuttings are those which issue from the main stem, and which are of a short stubby character. These may be taken off either with a heel or cut close off with a sharp knife. The cuttings should be planted in a light sandy soil, and after being about a fortnight in the frame they will be sufficiently rooted to be replanted into single pots; when they have filled the pots they must be moved into those of a size larger. But the best season for propagating the *Fuchsia* is in the spring, when it is desired to grow handsome plants in pots, for the drawing-room or balcony. The mode of procedure is as follows: when the bed is first formed, let some of the old plants which have been taken from the borders in the previous autumn be placed inside the frame; in the course of a little while they will begin to throw out young shoots, many of which in the first instance will be long and weak; the shortest and stoutest must therefore be chosen and made into cuttings, which should then be planted in a cutting-pot in the usual way. When the cuttings are rooted they should be replanted singly into small pots, filled with a compost of turfy loam, leaf-mould, sand, and a little charcoal, and return them again to the frame. They will now begin to grow very rapidly, and the great object to be attended to is, to see that they receive no check, but are kept in a constant state of growth. For this end they must not be allowed to become pot-bound, as gardeners call it, that is, the roots must not entirely fill the pot; but whenever they have nearly filled it, the plant must be removed into one a size larger. As the plants increase in size, and after they have received two or three shifts, the soil into which they are removed should have the addition of some very old and well-fermented cow-dung mixed with it. This will encourage them in a free growth, and they will soon become large and handsome plants, the size being regulated by the size of the pots into which they are finally planted: such is the mode of spring raising. But the plants so obtained are not so good for planting out in the open air as those are which are propagated in the autumn; as they are, from being so quickly grown, so much more brittle and tender.

Pelargoniums.—The best time to propagate *Pelargoniums* is just after or about the time they finish blooming, which will be towards the end of July and beginning of August. The shoots which should be selected for this purpose are those which have not produced a flower, and which are the short, lateral productions of the stronger stems. When they are separated from the stock plant, they should either be slipped off with heels to them, or cut clean off at a joint with a sharp knife. To prepare them for potting, the two or three lower leaves must be removed by cutting them off close

at their base ; the cuttings should then be allowed to remain for some time in a dry, airy situation, so that the wound may be slightly dried, and after this is done, they may be inserted in the cutting-pots. The soil with which the pots must be filled should be of a fine sandy loam, with a little mixture of leaf-mould. The size of the pots should not exceed five inches, and indeed many propagators prefer inserting only one cutting in a pot ; but as there will necessarily be failures, perhaps the better way is to use the five-inch size. In inserting the cuttings, they should be set all round the edge of the pots, which should now be plunged into the soil of the bed. In the course of three weeks or less they will have thrown out roots ; this can be ascertained by taking hold of a leaf and gently pulling it ; if it retains a firm hold of the soil, it may reasonably be supposed that they have taken root, but if not, they will come up readily. When it has been ascertained that they have acquired a good supply of roots, they may be transplanted singly into what are called small sixty-pots, using the same soil as we have recommended for the cuttings. Let these pots be again returned to the frame, so that the plants may go on forming a growth of shoots ; and after they have filled these pots they must be removed into others of a size larger. After receiving this second shift, they must be gradually hardened off by placing them in a situation where they will get abundance of air, and this will be all the treatment they will require before the following spring. About the month of March the plants must be turned out of the pots in which they have been kept during the winter, and all the old soil shaken from the roots. The roots must be slightly reduced in bulk, and the plants repotted into fresh, clean pots, with soil of the same description as already mentioned, to which may be added a little rotten dung. The plants must be kept in the frame until they have made a growth, and all danger of late frosts is gone, when they may be planted out in the flower borders.

Scarlet Geraniums.—The same instructions which have been given for the propagation and management of the Pelargoniums are also applicable to the Scarlet Geraniums, except that, before planting the cuttings, they should be kept for a day or two on a shelf in an airy place, and allowed to become considerably dry. In keeping Scarlet Geraniums during the winter, they must receive a very small supply of water, indeed scarcely any at all, and kept in a dry cellar where they will be securely protected from frost, and not receive too much light : in other respects they may be treated in the same way as other Pelargoniums.

China and Tea-Scented Roses.—It is not only the China and Tea-Scented Roses which may be propagated in the garden frame, but also the Bourbon, Noisette, and Boursault varieties. The shoots which are adapted for making cuttings are those of the current year's growth, and they should not be too old or very firmly set ; those which are rather tender, and only just beginning to set at the base, are the best. The cuttings should be stripped off with a heel to them, and then smoothed with a sharp knife. The soil with which the pots should be filled must be well-decomposed leaf-mould, and the cuttings inserted all round the side of the pot, and so

placed that the leaves with which they are furnished will not come in contact with each other. After being slightly watered, they should be placed in the frame on the surface of the soil at first, and after a week, when they have somewhat callused over, the pots should be plunged almost the whole of their depth in the bed. When the cuttings have taken root they must be repotted into single pots, as has already been directed for other plants. The soil used on this occasion should be fine sandy loam and leaf-mould, with a considerable portion of rotten dung. When the plants are well established in the pots, they must be hardened off, and prepared for undergoing their wintering treatment in the cold frame.

Verbenas.—We are almost doubtful whether to treat of the Verbena in this division of our subject or not, for it is a plant which may be propagated so readily without the aid either of a frame or hotbed, simply by pegging down the shoots in the open border, and roots will be emitted at almost any joint. As cultivators are not very fond of disturbing the order of their flower beds, so long as they can have flowers in them, we cannot expect that they will remove any of the plants before the frost has set in upon them. To make sure, therefore, of a stock for planting out in May or June following, there should be a goodly quantity of cuttings put in about the end of July or beginning of August. The same instructions that have been given for other soft-wooded plants will be equally applicable to them; and as our space is becoming rather limited, we must say as much as we can in few words. As regards *Cinerarias*, *Chrysanthemums*, *Petunias*, *Hydrangeas*, and other plants, which are generally termed “bedding plants,” they may all be managed in the same way; we shall, therefore, not enlarge upon this subject. It may be as well, however, before leaving it altogether, to remark that great attention must be paid, during the process of propagation, to see that the cuttings are well shaded, for if exposed, even for a short time, to the influence of a summer sun, it is ten chances to one if a whole frameful of cuttings is not entirely ruined.

(To be continued.)

THE PAMPAS GRASS.



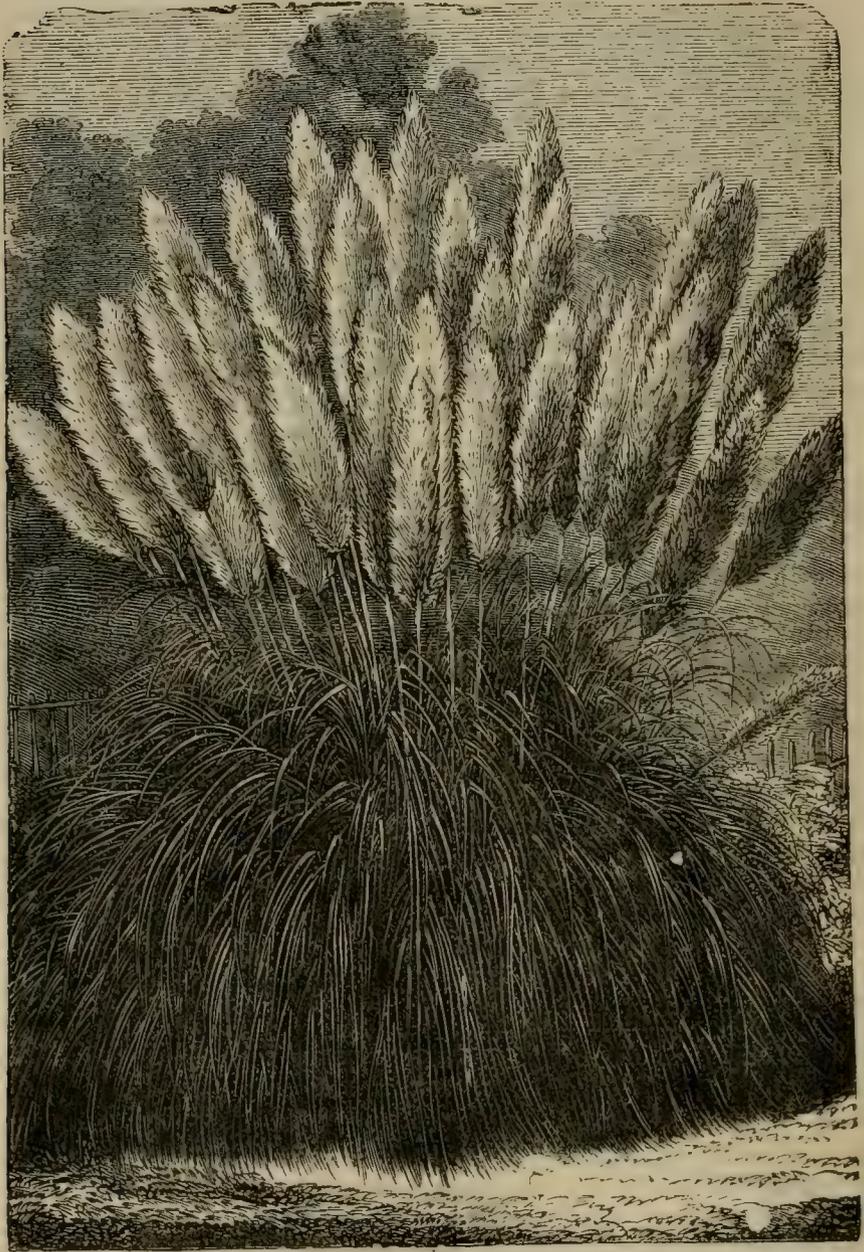
HERE is scarcely a garden of any pretensions that is not by this time adorned with the magnificent *Gynerium argenteum*, or Pampas Grass. Unlike many other newly-introduced exotics, this has had no ordeal of adverse opinions to endure in establishing its claims to general admiration. The only point about which there was any uncertainty was as to its hardiness, and that point is settled to the satisfaction of the inhabitants of the most northerly districts of our island, for it endures the extremest severity of the British winter, and to some extent is indifferent as to the aspect in which it is grown. At the Crystal Palace it forms a striking feature for the fronts of shrub-

beries; at Kew it towers up on the margin of the lake, a true queen of the greensward; and in private gardens everywhere it has its place—in the rockery, the rootery, and beside the fish-pond.

Like some of our commonest English grasses it will grow anywhere, no matter what the nature of the soil or climate, but there will be a vast difference in the respective luxuriance and beauty of plants grown under circumstances congenial to the habit of the species, and those grown under difficulties. In a dry, barren sand it will throw up its elegant tufts of green, but never attain to its proper stately dimensions, and in a hot aspect the colour of the foliage will be injured during the latter portions of the summer season. To grow it well it requires a deep, moist loam, heavily enriched with rotten manure and leaf-mould, and, during its season of vigorous growth—from the end of May to the end of September—it should be frequently supplied with weak liquid manure. Its proper home is beside the rapid and frequently-swollen streams of the South American Pampas, where it forms dense jungles, through which it is impossible to pass, except by cutting a way through, owing to the serrated character of the margins of its wavy leaves.

The best season to turn out small plants from pots is from April to the end of May. A hole, three feet deep and four feet wide, should be made. Into this should be thrown a mixture of rotten dung, leaf-mould, and fat loam, in about equal proportions, till the hole is filled up to within eighteen inches of the surface. It should then be filled up with loam and leaf-mould only, and the plant should be turned out in the centre, and firmly made up with the soil. A few good waterings will cause the roots to strike out into the compost, and after that the plant will prosper with no other attention than occasional supplies of moisture. The soil in which it is planted will probably sink in the course of a few weeks, when it should be liberally mulched with short dung only half-rotten, the foliage of the plant being gathered up and tied to a stake when the dung is laid down, in order that none of the leaves may be covered. The soil around the plant should on no account be elevated above the surrounding surface; on the contrary, it should be below that surface, as in the case of an American bed, in order to retain as much as possible the heavy summer rains. Established plants may be taken up and replanted with perfect safety any time from December to April. We have transplanted large specimens during winter for three seasons past, and never lost one, though very severe frosts followed the transplanting. If the plants were cut over close to the ground at the time of such transplanting, they would probably perish; therefore let the old foliage remain. It will wither and form a protecting screen to the crown of the plant, and may be cut away carefully as soon as the new spring growth appears. As the seeds of this plant are now offered through the ordinary trade channels, we advise those who wish to plant in any quantity among their shrubberies and collections of ferns and grasses, to raise a stock from seed. It may be sown in any of the ordinary fine composts used for spring seeds, and is best started with a gentle bottom-heat, the plants to be kept under glass in a cool house till large enough to

be potted singly in thumb-pots, and then into sixties, after which they should be removed to a cold frame, have plenty of air, and be shaded from mid-day sun. Contrary to general expectation the



GYNERIUM ARGENTEUM, OR PAMPAS GRASS.

Pampas Grass has a very noble appearance in the centre of a lawn, or, indeed, anywhere standing clear of other objects on a surface of turf. Flower-gardens laid out on turf would in most cases derive

additional interest by the use of the Pampas grass for centre and corner pieces, and in divisional lines where a tuft-like mass would have the effect of connecting several sets of colour into one whole. We could give measurements of many fine specimens that have come under our own observation during the last three years. We saw one plant last autumn which had a circumference of twenty-six feet, and twenty spikes of bloom twenty feet high. The bloom-spikes rarely exceed twelve feet, but in rich soils, on the margins of lakes and in the partial shade of trees, they rise higher, and the bloom is much more luxuriant. We have seen as many as fifty spikes of bloom on a plant so circumstanced. Where it is intended to plant in very conspicuous positions, it is well to endeavour to get female plants, as they have a much more noble appearance than the males when in bloom. The noble specimen figured in illustration of this article is in the nursery of Messrs. Sutton, of Reading, and the representation is from a photograph taken when the plant was in the highest perfection and loaded with nearly forty of its silvery plumes. Messrs. Sutton have a large stock of seed.

CULTIVATION OF THE FANCY PELARGONIUM.



THE fancy pelargonium is one of the most useful subjects for culture in ordinary greenhouses, and it is moreover a general favourite. Its profusion of bloom, long continuance, short sturdy habit, and many delightful tints of colour, render it popular with all lovers of flowers, and insure its cultivation, to an extent commensurate with the glass accommodation in all good gardens. As it is now coming into bloom, collectors of varieties, who can avail themselves of the opportunity, will do right to visit the principal exhibitions, where may be seen the results of skill and care, that have combined to rear and preserve, and bring to perfection as specimen plants, some of Nature's most beautiful objects. At the exhibitions, the amateur grower may obtain hints for improving a collection, by noting new varieties, and judging of the style of cultivation most suitable for each particular kind, and for the particular structure in which the plants are to be bloomed. To give a universally correct style for a specimen is somewhat difficult, as it wholly depends upon what it is intended for; we see pyramids trained so regularly as to terminate at top in a single central bloom, which, if for a low position in the conservatory, show their blooms admirably, but we do not set much value upon them for general purposes. Others are grown to a perfect circumference with a medium rise in the centre, suitable for a low stage or a flat table: This is a very showy and effective style, and one we much admire. Some have the back trained perpendicularly, and the front shoots brought below the rim of the pot, so as to form a pyramid or half-circle. These are most suitable for a lean-to stage, as they show a large front. In forming, or first training for a specimen, bear in mind that as the twig is bent so will the tree be inclined, hence the

necessity of deciding early upon the description of plant required. Plants grown as bushes and in larger pots than thirty-twos, soon require considerable thinning, or they will become weak. The time of propagation depends on whether the plants are bloomed early or late; for the main stock, July may be taken as the average time. Supposing the plant to have done blooming, and the wood to be well ripened, from full exposure to the sun, and from three or four days' dryness at the root, they are then fit for cutting down. Upon the way they are cut depends the form of the plant the ensuing season, the object being to have an uniform plant without much twisting, and upon an established bottom, large or small. After cutting down, place the plants in an open place, shading for a few days, until the ends of the shoots that have been cut are dried over. Water but moderately until there is a sign of fresh growth, then give a slight syringing overhead and shut up early with the sun, so as to cause evaporation, which will much assist them in making fresh growth. After the first start, they are to be grown as slow as possible through the autumn and winter months. The next operation, after cutting down, is to select cuttings of the strongest and the best ripened wood, in lengths of two joints, with a straight cut at the bottom, a little below the lower joint, and a slanting cut of a half-inch above the top joint; place them in the mould round the sides of the cutting-pot, midway between the two joints. The mould should be a compost consisting of loam three-fourths, leaf-mould, or peat, one-fourth, with a medium addition of sand. Give them a gentle bottom-heat, and shade lightly for two or three weeks, by which time they will have struck, and should then be taken to a cool house, and gradually hardened off so as to bear full exposure to the sun and air. They should then be potted off as soon as possible before the roots get too long; indeed, it is thought by some that if they are merely callused over, they are fit for potting off. I, however, like to see a few fibres, but not too long, the one excess being as bad as the other. After potting off, keep them rather close for three or four days, and shade from hot sun, then give a full circulation of air at all opportunities, avoiding easterly winds. Attend to potting on until you reach the sized pot intended for blooming; gradual shifts from one size pot to another are to be recommended as preferable to large shifts. If intended to bloom the plants in forty-eight size pots, they should have three changes from the cutting-pot, and the crown, or centre bud, should be taken out in the second shift; but if the growth be then not far enough advanced, it should be removed as soon as possible after the last potting, keeping the plants rather dry for a few days until fresh breaks appear, otherwise weakness may be expected. If intended to bloom in large sixties, no stop is required, and if properly grown side breaks will appear at the same time that the crown truss is forming, thus supplying a succession of bloom. For specimens, commence with small plants of free growth, allow them to attain the height of nine joints, with two joints for a single stem, not merely for the appearance but to diminish liability to canker, which may be feared if the breaks are allowed to rest upon the surface soil; also by constant pottings the plants are

liable to get some portion of the bottom breaks below the surface of the soil, particularly such as are known amongst growers as of a "miffy" habit, that is, of a delicate constitution and high breed, which require great care to be taken as to their watering and drainage. Suppose then that we have a plant in a forty-eight size pot, eight or nine joints high, ready for its first stop, take the crown clean out, midway between the two joints, keep the plant dry for three or four days, unless the season of the year should be hot and cause it to flag, then a slight watering overhead would aid the action of the sap in the foliage. The first breaks will soon make their appearance, provided the root action be all right; after the first breaks have attained the length of six or seven joints, they should have their first stop whatever mode of training may be adopted. The training usually followed is pegging the shoots out; I prefer tying a piece of bast round the pot, close underneath the rim, and bracing the shoots down to it, which is a neat and ready system. When the breaks have attained the length of six or seven joints they may be stopped again and tied out. The exact time of stopping must depend upon the quickness of growth in young plants, but avoid stopping after March if possible, and at farthest not later than the middle of April, otherwise there is not sufficient time for ripening the wood, a matter of the greatest importance to insure good quality of bloom.

SHRUBBY VERONICAS.



HERE are various ways of growing shrubby Veronicas. They are sometimes planted against dwarf walls, and in sheltered places do not greatly suffer from the frosts of winter. The writer remembers in a garden in Hampshire a dividing fence formed of *V. Andersoni*, which presented a remarkable and most beautiful appearance at all seasons, and especially when in flower. For ordinary decorative purposes pot specimens have the best effect when formed into regular pyramids with an even distribution of furniture from top to bottom. A good specimen should measure four feet in height from the rim of the pot, and four feet through at the base, tapering thence regularly to the summit. When grown for plunging out-of-doors to form autumn groups, a columar style of training will be the best, or say an outline approximating to a Lombardy poplar, as this allows of placing the plants close together, and a better effect is produced than by plunging specimens broad at the base.

To grow fine specimens, the soil should be good turfy loam, enriched with a third part of decomposed hot-bed manure, and with an admixture of broken crocks or bricks to keep the soil open. The young plant should be trained perfectly straight, so as to secure a strong leader, from which in subsequent growth a regular disposition of side branches will proceed. From April to August the plants are to be shifted to larger and larger pots as they require them; they ought never to be thoroughly pot-bound until they have attained

their full size, and are wanted to flower finely; but, on the other hand, each shift should be slight, as over-potting at any stage is nearly as bad as allowing them to become pot-bound. After the middle of August there should be no more repotting, but in the month of April all the specimens should be turned out of their pots, the balls reduced, and much of the old soil be removed, and repotted again either into the same or into pots one size larger. As in the spring they do not evince much activity of growth, they may be pruned back when repotted. This should be done in a way to cause a regular disposition of shoots according to the form required, and as they break freely from old shoots and from the stem, ugly specimens may be pruned very severely, and if kept shaded and frequently syringed, with only a little water at the root, will soon throw out abundance of shoots, which the cultivator can keep or remove as may be needful. At the beginning of June all fast-growing plants which it is desired to form into compact specimens should be stopped; that is, the points of the shoots should be pinched out; this will cause them to produce side-shoots, and there will be ample time for these side-shoots to be fully matured before the close of the season.

The following varieties are the best in cultivation—*Andersoni*, grows freely, and flowers abundantly; the variegated-leaved variety of *Andersoni* is extremely beautiful and more tender than the green-leaved kind; *Anne de Beaujen*, bright rose and white; *Devoniana cœrulea multiflora*, dark violet and white; *Gloire de Loraine*, blue and white, beautiful habit; *Imperatrice Eugénie*, amaranth; *Mammoth*, violet and white; *Multiflora*, dark violet and white; *Rubra elegantissima*, violet purple; *Rubra splendida*, rich crimson.

CULTIVATION OF THE PANSY.



HAVING been a grower many years, and a successful exhibitor, I think that without presumption I may give some of the results of my experience for the benefit of those who may require it. Before going further, I would have the novice in the culture of the pansy to understand that a person may be a very successful grower, and yet be very unsuccessful as a competitor. The plants may be ever so well grown, but it requires one who thoroughly understands the properties of the flower to make up a stand for competition; there is also a great knack in laying down a bloom; it must be kept in mind that they stand very little handling, and that only of the most gentle description. The beginner should therefore direct his attention to both the culture and the markings or properties of the flowers.

To grow pansies in the open border, a piece of ground should be selected well sheltered from high winds, but at the same time quite open to the sun and air. If a crop of potatoes has just been taken off, so much the better; if the ground has been manured for the

previous crop, it will require nothing but digging; if not, a little rotted turf or very old stable manure should be added. The pansies should be planted in rows, about one foot apart, and from eight to ten inches apart in the rows. The end of September or beginning of October is the proper time for planting to bloom in May or June; for the autumn exhibitions, they will require to be planted in April or May, or even later, according to the climate or exposure. Just before beginning to bloom, a top-dressing of leaf-mould or very old manure will be beneficial; liquid manure, especially if the least too strong, is apt to cause the colours to run, and the blooms to come flabby and rough-edged.

Cuttings should be struck whenever they can be got. Side-shoots strike freely all the summer months, in a border on the north side of a wall or hedge, using plenty of sharp sand. When not required for exhibition, the plants should be cut over, and in a few weeks there will be an abundance of offsets, some of which will be nicely rooted plants; those that are not rooted will strike much faster than cuttings taken from the branches, and form much more healthy plants.

The flower-buds ought to be taken off as fast as they appear, until within about three weeks before the day of exhibition. For a few days before the blooms are required they should be shaded with thin cotton or other light fabric, being careful not to place the shading too near the plants, or the colours will be bleached; indeed, they should be shaded as little as possible, and then only from bright sunshine or rain. Keep a sharp look out for green-fly. It is perhaps safer, however, to use precautionary measures. Make a strong infusion of tobacco, and with a piece of rag or sponge run a little of it into the heart of each shoot. Repeat frequently, or until the vermin disappear.

For exhibition purposes it is advisable to grow a number of plants in pots; they can be much more easily protected from weather and vermin, and generally speaking the blooms are finer in quality. There are some varieties it is of no use attempting to grow in pots, as their colours almost invariably run. The plants should be put into thumb-pots about the beginning of October, and plunged in sand in a cold frame; the sashes should not be used unless during severe weather. Take the first opportunity after the middle of January of shifting to eight or nine-inch pots. Soil, decayed turf and leaf-mould in equal parts, with a little sand; it ought to be mixed in the beginning of winter, and thrown into a sharp ridge, in order that it may get all the frost going. Plunge the pots about half their depth in a frame amongst sand or sifted coal-ashes. Never put on the ashes, except during hard frost or drenching rains, until the last week before the exhibition, and not even then unless the weather is wet and variable; the sashes not to be nearer to the plants than two feet, and allowing a free circulation of air all round the sides.

Pansies in beds are easily protected from snails by putting pieces of board on edge all round the beds, and occasionally give the boards a touch along the outside with coal-tar; the frames can be

protected in the same way. There is no way of preventing the ravages of the wire-worm, or julus, but by hand-picking; it causes considerable trouble, but it is the only way to get rid of them.

B. D.

THE GARDEN GUIDE FOR MAY.

THE FLOWER GARDEN.



CHRYSANTHEMUMS not wanted for exhibition may be struck this month, as May cuttings make very good plants. Strike the young tops in a shady border, under hand-lights, and give them liberal culture as soon as they have got roots, when plant them out in good soil, enriched with rotten manure. Plant out dahlias the first or second week, and protect on frosty nights by inverting bell-glasses over them. Should you be unable to give them this protection, you must wait till the third week, and then plant. Dahlia roots may be got in as early as convenient, and had better be cut to one eye, as if they are allowed more than one stem, they grow rank and bushy, and rarely flower well. Take cuttings from hardy border plants, and especially from those which have double flowers, or are in any way difficult to raise from seed, such as dielytras, double feverfew, &c. &c. Take auriculas out of the stage, and place them on a hard bed of gravel, or coal ashes, to enjoy air and rain; do not cut off the flower-stems till they are quite withered. Plant out annuals from seed pans, and get out the hardiest of the bedding stock towards the end of the month. Keep lawns and walks very trim, by means of scythe, roller, and shears. Tender annuals such as asters, zinnias, etc., may now be sown in the open ground. This is a good time to sow hardy and half-hardy perennials of all kinds, to get strong plants for winter, either to remain out or to have the protection of a frame or to take up and pot for early blooming in the greenhouse. Chinese primula should be sown now for the next spring. Carnations and picottees should be staked without delay, and then shoots thinned. Part and plant polyanthus and primroses that have done blooming, and give them a shady aspect. Should it be intended to have fresh gravel, it would be advisable to defer it until the beds are filled, when the whole garden acquiring its full summer gaiety, a coating of fresh gravel then will add much to its fresh and bright appearance.

KITCHEN GARDEN.

Sow, in heat, melons and cucumbers, for succession, or take cuttings from strong plants, for planting out on ridges at the end of the month, or early in June. Transplant from seed beds, as fast as the young plants get at all thick, and use the hoe wherever weeds appear, so as to keep them down before they have time to flower. Choose showery weather, if possible, for transplanting, or else give shade for a few days, and gentle waterings. Plant out capsicums and tomatoes, under the hottest wall you have, and to promote their rooting put a spadeful of hot dung a foot or eighteen inches deep under each, and cover with bell-glasses till they get hold of the new soil. See that cucumbers have sufficient bottom-heat, and give fresh linings if necessary; a little dry litter, mixed with the dung, will tend to prolong the fermentation. Trenches should now be made for celery, and six inches of rotten dung forked into the bottom of each. A dull or showery day should be chosen to put out the plants, and plenty of water given during dry weather. Put sticks to rows of peas as soon as they require it and well bank up those that are forward. Thin parsnips and carrots to eight inches apart. Flat-hoe potatoes, and draw but little earth to their stems; the old method of moulding them up has proved to be no benefit at all—rather an injury, as the heat of the sun cannot have too ready an access to the roots. Sow beans and peas for succession,

savoy for late crop ; cabbage, broccoli, kale, beetroot, French and runner beans, lettuces, spinach, and turnips for a late supply.

FRUIT GARDEN.

Give plenty of water to strawberries in dry weather and occasionally a pretty strong dose of liquid manure. As the fruit sets on wall trees, thin it, so as to throw the strength into those left to ripen. Syringe both wall trees and standards that are at all affected with vermin. Netting is an admirable protection for trees against the late spring frosts that often do so much injury. The netting should be kept dry when out of use, when it will last for years ; every fruit grower should have a sufficient quantity of it. Should any of the fruit trees be newly planted, they should be mulched with grass mowings. Bush-pears are greatly benefited by being kept moist round the stock and over the surface roots. All foreright shoots on peaches and nectarines should be removed unless they show fruit at the base, when they should be stopped. All young shoots of grape vines bearing fruit should be stopped one eye beyond the bunch. The side-shoots of pears should be stopped by pinching them off when a few inches long ; this is a better method than letting them run to eighteen inches or more and then cutting them back ; the principle is equally applicable to wall, or espalier grown trees.

GREENHOUSE AND CONSERVATORY.

Strike fuchsias, geraniums, verbenas and petunias, for blooming in pots in the autumn, give them liberal culture, and stop frequently, to induce compact bushy growth. Cut down cinerarias that have done blooming and plant out the stools, to furnish a supply of offsets. Cut in pelargoniums that have flowered, and strike the best of the cuttings. Calceolarias now coming into bloom will require to be smoked pretty often, owing to the fondness of the aphid for their tender shoots. Give them liquid manure once a week and not over strong, and let them have a shady part of the house, and the pots plunged in moss to keep the roots cool. Camellias done blooming should be kept warm and moist, to induce a quick growth of new wood, and those that have made their young shoots should have air by degrees, preparatory to putting them out in a shady place for the summer. Stop all hard-wooded plants not required to bloom at present, and give shade when necessary.

STOVE.

Pines require a little shading in bright weather, and should have a heat of 75° at night, and 85° to 90° by day. Many plants here will require a shift. Use the syringe freely and give plenty of air. Vines that have their roots in inside borders, should be liberally supplied with water and the shoots should be tied in in good time. Vines in pots will require frequent supplies of liquid manure, and the stopping of laterals must be attended to, to regulate the growth. Red spider must be kept in check by the use of sulphur, and one of the best methods of using it is to paint the pipes with a mixture of sulphur, lime, soot and water.

PITS AND FRAMES.

The bedding plants to be kept growing till of sufficient size for hardening off, and fresh cuttings put in of those sorts of which the stock is deficient. Those that are in a fit state for turning out, to be carefully hardened first, but avoid any severe and sudden check. Place them in cold-pits first and shade from the mid-day sun, and cover up at night. By degrees let them have full exposure, and be left uncovered night and day before turning out. Cucumbers will require plenty of air and a brisk bottom-heat. Re-line the beds where necessary. Train and thin the shoots.

TO CORRESPONDENTS.

DAHLIA CUTTINGS.—*J. S., Croydon.*—Your non-success arises probably from want of more bottom-heat. Test it by a thermometer, it should be from 85° to 90°.

PINKS.—*J. Barnes.*—Use liquid manure thrice a fortnight; it will soon improve their condition.

THUNBERGIAS.—*E. D., Ebury.*—These may be raised without a hot-bed if you have a greenhouse, but it would be better to wait till June unless you can place the pan containing the seed on the top of a boiler or on a flue to give them a start. Where the means are limited, it is as well to defer sowing seed of tender things until the season is a little advanced; after midsummer the ground is a natural hot-bed, and by shutting a frame close in the full blaze of the sun, many seeds that ordinarily require artificial heat may be started without it.

MELON CULTURE.—*Amateur.*—Your pit will do well if you make up a dung bed inside, and ventilate and water frequently till perfectly sweet; then form hollows two feet deep and fill them with brickbats, with a turf, grass side downwards, on the top level with the surface of the bed; then make small hillocks on the grass sods to turn the plants out on, and keep up the heat as fast as it declines by means of linings, and as the heat must be brisk, give plenty of water round the sides to prevent burning, and maintain the heat just under 90°. Add more soil as the plants require it, and turn and change the linings frequently; a few drain pipes laid in to the interior of the bed from the linings will assist in diffusing the heat. The seedling plants should be stopped by pinching out the centre as soon as the rough leaves appear and be got strong before planting out. Two plants are sufficient for each light, and the runners must be trained regularly. Give plenty of water while fruit is swelling, but keep rather dry as soon as ripening commences. They require the fullest sunlight they can have. You ought to have sown six weeks earlier to have had them strong in pots for planting, so had better not be in too great a haste to get the pit ready.

ERICAS DONE BLOOMING.—*B. J., Loughton.*—Ericas done blooming should be re-potted if they require it; if not, remove the surface soil and dress them with fresh peat, full of grit and fibre, and put them in a cold frame setting each pot on an inverted pot. All pots must be well drained, and the plants have air night and day all through the season. Shade them from the fierce midday sun.

VINES NEWLY PURCHASED.—*J. Chater, Highgate.*—Your vine three feet in length, the thickness of a cedar pencil, with a dozen buds on it will not do. Cut it down to the plump bud, about six buds from the base, and rub away the three lowest buds. You will thus have perhaps three buds and a leader. Let the leader start strong with the buds left below it, till these side shoots are three inches long. Then pinch them back and in a fortnight remove them. Altogether you will thus get a straight strong rod to train along the trench. Next season cut back the leader to twelve buds from the base and then the side shoots are to be allowed to push until they show their branches, and then be stopped one bud beyond the bunch, and all laterals must be stopped two buds from the base of the shoots they come from. Every year you must leave on each spur a bud for fruit and a bud for wood, the wood bud to be the one next the base of the spur, and fruit bud to be the fourth or fifth from it; the intermediate buds to be removed.

GERANIUMS AND HYDRANGEAS.—Your rich soil and moist air ought to suit hydrangeas, so we fear your system must be wrong. That geraniums grow rank in it is quite likely, and that may be corrected by plunging instead of turning out; but take care that under every pot plunged there is a large piece of hollow crock or tile, to prevent worms getting up into the roots and to keep the drainage safe. But it would be better if you would make your geranium beds of the poorest soil you have and raise them above the surface to make them drier. A mixture of old mortar and brick rubbish would help to correct the richness of the soil for the scarlets, but it would not be too rich for any of the variegated sorts. Placing pots in saucers is not a good plan, except for plants exposed to a hot sun, where the water is soon taken up.



RANUNCULUS PYRENAICUS

RAMONDIA PYRENAICA.



HIS beautiful Alpine, which is found growing in the Piedmontese Alps, and on the rocks of the Pyrenees, is the only species of its genus, which was formerly called *Verbascum Miconi*. The flower-stems, which spring from the dense dark green leaves, bear each from one to six flowers, of a pinkish-lilac colour. The plant, which is a perennial, commences to bloom about the beginning of May, and a succession of bloom is usually maintained for a considerable time. Its dwarf habit of growth renders it very suitable for the front rows of flower borders; the soil in which it best thrives is moist peat, mixed with sandy loam. The method of propagation is either by seed or division of the roots.

 DAHLIA CULTURE.


HAVING got the first lot of plants with names and colours, arrange them so that no two colours of the same class come together. Put violet next yellow, purple next orange, and white to relieve any colour as to the contrast for which you may be in doubt. The arrangement of dahlias is of more importance than the arrangement of any class of flowers, because of their boldness of colour, and the extent to which those colours may be heightened by proper contrasts. The border or bed for dahlias should be of good hazelly loam, abundantly manured, and should be prepared long before the plants are put out, in just the same way as directed for hollyhocks. Before planting, which should be done when the ground is moderately dry, tread the earth firm, then press the pot down into the place where the plant is to be, and if you can make a place to receive the plant without using a trowel, all the better; if not, take out a little earth with a trowel and plunge the pot to the rim, and bed it in firmly. Then take the pot out of the hole, into which it has thus been made to fit, turn it upside-down and the edge a slight tap on the barrow, and the ball will come out clean, and may be turned over into the hole without damaging a single fibre. This is the best way of turning every kind of plant out of a pot, but is particularly to be recommended in planting dahlias, because of the tenderness of their roots when young.

Whatever the kind of soil in which dahlias are planted, it must be well manured—a good spadeful of rotten dung to every plant, and another spadeful on the surface to keep the roots moist. I use none but iron stakes for dahlias, hollyhocks, etc.; they are neater, cleaner, and last for ever, if their feet are brushed over with melted pitch, and the remainder of the rods painted. If wood stakes are used they should be of oak, and it is best to place three to each plant, and

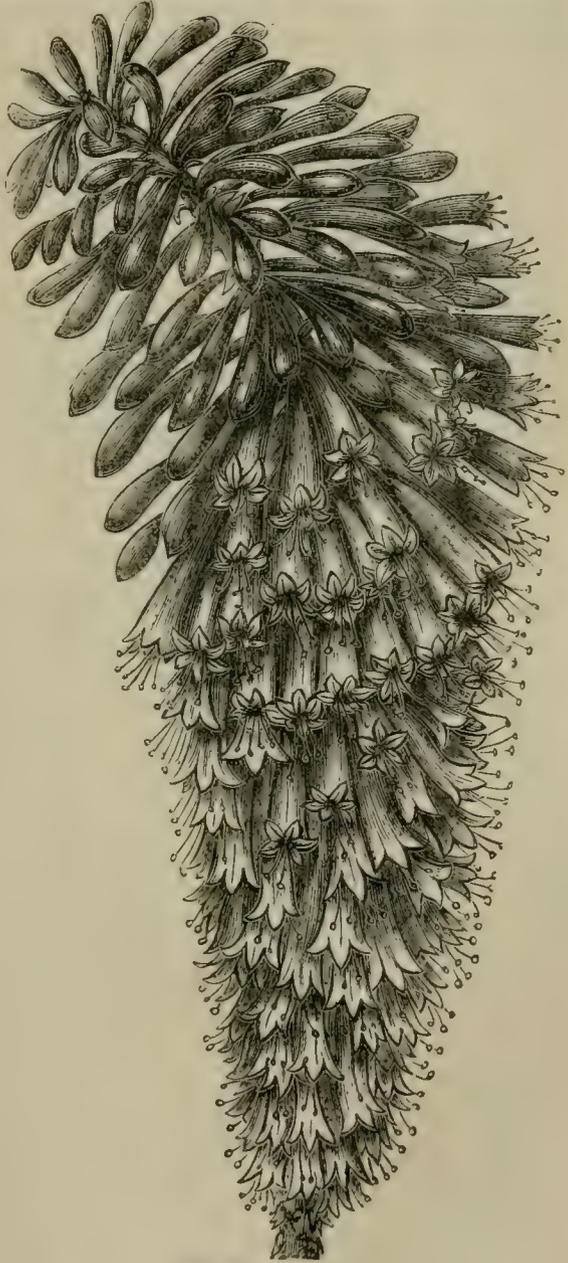
tie out the branches to them so as to form a round bush with a good head, and the flowers regularly displayed all over it. Plenty of water must be given all through the summer, and in rainy weather it will strengthen the blooms to give a little liquid manure. Only one stem should be allowed to a plant, and any ill-placed side-shoots or rank superfluous growths should be cut clean away to the base. Plants that bloom too profusely should be thinned of their buds to get finer blooms; this is a very necessary practice where dahlias are to be cut for show, or where the highest perfections of a choice sort are to be fully brought out. The dahlia is a robust grower, and rarely fails to reward the painstaking cultivator. It is not much given to green-fly or thrips, but earwigs devastate its foliage and bloom-buds to a terrible extent, if allowed to gain the ascendancy. These vermin, however, may be trapped with the greatest ease, for they feed at night, and on the return of daylight take shelter in any neighbouring crevice. Hence a flower-pot stuffed full of hay or moss and mounted on a stake, is a very effectual trap; but better still, cut beanstalks into six-inch lengths and thrust them into the middle of the plants over night, and early in the morning take them out and blow the earwigs into a pot of salt and water. Crab-shells, lobster-claws, and other ill-looking devices, are used in cottage gardens; but they spoil the beauty of the garden, and it would almost be better to let the earwigs eat up the dahlias root and branch than trap them with such deformities. There is an excellent implement known as "Edwards' Earwig Trap," made by Edwards, of Paul's Square, Birmingham, which every dahlia-grower should use in preference to the rude traps which so disfigure a garden.

As soon as dahlias die down in autumn—and the first frost will turn them black and bring their glory to an end—cut them clean over to the ground, and lift the roots carefully with a fork. Take them up without bruising the fleshy tubers, and at once attach tallies to them, to prevent mistakes at next season's planting, and lay them in some spare dry corner with a little earth over them for a few days. Then shake off the mould and lay the roots in shallow baskets, and store away anywhere out of reach of frost or damp. The least touch of frost will kill them, and damp, for any length of time, will cause them to turn mouldy and rot. An attic is an excellent store-room. The dahlia is of precisely the same constitution as a potato; every eye on the tuber will make a plant, and tubers cut so as to leave one eye to each piece may be planted at the end of April or early in May, and will throw up a stem and make a good plant. But the usual way is to get them forward in heat, so as, by having plenty of roots and a stem already formed before they are planted out, to get them earlier in bloom. Hard-eyed sorts never bloom well in London.—*Town Garden*, 2nd edition.

TRITOMA UVARIA.



THE "Torch Lily," or the "Red-hot Poker Plant," as *Tritoma uvaria* is frequently designated, is unquestionably one of the most valuable hardy plants for producing a grand display of colour during the autumn yet known to science. It is of robust habit, not particular as to soil and situation, and it can be multiplied at discretion by simply lifting the large stools and cutting them up into a certain number of pieces. The best effect is produced by planting fair-sized clumps at intervals along the front of shrubby borders, and then allowing them to remain undisturbed until they attain a large size. The Tritoma, in common with many other hardy subjects of robust growth, makes the most satisfactory progress, when occupying a position in deep rich soil, therefore it should be planted in borders quite free from the roots of large trees, and receive a dressing of manure annually, or once in two years. Partly decayed manure is the best, and in applying it, spread it round the plants to a depth of about four inches, and to a distance of eighteen inches from the base.



TRITOMA UVARIA.

June.

CULTURE OF THE BALSAM.

BY R. W. P.



EXCEPT in a few first-rate private establishments, it is rarely we see respectable specimens of the balsam, though it is one of the most popular and showy annuals we possess. Even among nurserymen there are very few who grow really fine balsams, and as to amateur gardeners, not one in a thousand knows what the plant may be made to do when liberally treated. It is such a gay, free-flowering thing, that even a shabby lot of balsams has a cheerful appearance, whether in pots or planted out in the borders; and as they come of all colours, and single, semi-double, and double, there is no end to their variety. Now, having for many years enjoyed the pleasure of raising fine balsams, with stems as thick as one's arm, three feet high, and with heads of five or six feet in circumference, and every shoot loaded with huge double flowers of the most dazzling colours. I should like to be the means of setting a few readers of the *FLORAL WORLD* about balsam growing in earnest. We will first go into the commonplace part of the culture, for the information of those who simply want a show of border flowers.

It is most important to secure good seed, and, unless a good price be paid for it, it is not worth the trouble of growing. First-class balsams, being very double, produce scarcely any seed; hence, high price must be an accompaniment of high quality; and, after all, the mere cost of seed is so trifling, considering what splendid results may be obtained by having it really good, that the question scarcely need be raised. Still, at this season of the year, immense quantities of the worst descriptions of seed are sold in cheap packets; one half the seed in every such packet being dead, and the other half possessing a life not much higher than that of the merest weed. I defy any man to sell seed, worth the trouble of sowing, at five shillings for a hundred packets; better half-a-dozen good things for the same money, than a lot of rubbish, fit only to feed the sparrows. This applies more to balsams and stocks than any other flowers, because the poorer they are the more seed they produce, and, when they become thoroughly double, they give little or none at all.

Now, then, take your good seed, and sow a pinch in a seed pan, using very sandy loam for the purpose. If you can give it a little heat to start it, good; but if not, place it in a warm corner of a room, and keep it just damp until it begins to sprout; and then let it have light and moderate moisture till the little seedlings are large enough to handle, and by that time the weather will be sufficiently advanced for them to go to the borders. If they are all to be planted out, set them in threes, triangle fashion, six inches apart each way, and at least two feet from patch to patch. In planting, put a good spadeful of rotten dung under each patch, mixing it well with the soil; and when they are planted, spread another spadeful of dung on the surface, so as to mulch them and keep the roots moist. If the weather is cold, cover them every night with inverted flower-

pots, stopping the holes in the pots with an oyster-shell or bit of tile; and if dry sunny days follow the planting, let the pots remain over them all day for four days, and by that time they may be taken off every morning and put on at night, till the weather is mild enough to leave them altogether exposed. If a portion of the seedlings were pricked off into small pots, with rich loam and leaf-mould, and kept in a greenhouse or cold pit till they filled the pots with roots, they would produce a finer lot for the best positions.

Now, to make these border balsams worth the place you have given them, you must give them plenty of water from the very moment they begin to make growth. In dry weather, water them once a-day till they are six inches high; then water them twice a-day; and as they come towards blooming, give it them three times a-day; and from the first they should have liquid manure once a-week, then twice a-week, and at last, when they are setting for bloom, every other day, no matter if the weather be wet or dry; in fact, during rainy weather, the liquid manure may be a little stronger than at other times, and diluted house-slops is the very best stimulant they can have.

There is another point of equal importance that must be attended to in good time, and that is *stopping*. One reason why so many people have poor balsams is, because they allow them to grow and flower as they like, and the drier they are kept the sooner they flower; so that if left to themselves, they run up six inches, then produce a few miserable blossoms on the stem, and their career is at an end; but, by compelling growth instead of bloom, you may get them to almost any size you like; and the larger and stronger you have the plants, the more grand will be their show of bloom when they are finally allowed to display themselves. Therefore, when your little plants have half-a-dozen leaves, nip out the centre of each. They will then throw half-a-dozen side-branches; when these are a little advanced, nip them in the same manner, and continue stopping as fast as there are sufficient joints of the new growth to afford a basis for a fresh development of side-shoots. All this while give plenty of water, and increase the strength of the liquid manure; and if you never took much note of balsams before, you will be astonished to see the stems increase to the thickness of a stout walking-stick, and with splendid heads and bright healthy foliage. You must determine for yourself whether you will have them larger or not, for now they will, in spite of stopping, begin to produce flower buds. If these are allowed to swell, they will make very little more growth; but if every one be picked off, they will break again another crop of side-shoots, and make still finer heads; and if you want them in bloom by a certain time, you only need give them a fortnight in hot weather, or three weeks later in the season; and, by discontinuing stoppings and disbuddings, you will have them in bloom by that time—not a few miserable flowers on the central stem, but loaded to the extremity of every shoot, and one mass of colour all over. While they last they are superb indeed, but they do not last long; and unless you purpose taking seed from the best, they should be rooted up and got rid of as soon as they are past

their prime; and their places may be filled up with another later lot turned out of pots, or with late stocks, or something that will keep up the gaiety of the border till the frosts come.

You will easily judge, from the above directions, that, under pot culture, the balsam may be brought to a grand perfection. It is tender, it likes warmth, revels in moisture both at the root and in the air, and it must have a generous soil if fine plants and double flowers are required. Now, here's a field for any amateur who desires to win distinction as an exhibitor, and especially in the neighbourhood of London, for in and about the metropolis there is no flower so badly shown; indeed, we know not where, except in the midland counties, where amateur growers know what balsams should be, we may safely count upon seeing good balsams at summer exhibitions. It is all a question of growth, there are no secrets; keep them growing, stop, disbud, give them moist warm air and liquid manure in plenty, and give them not one check either by neglect in watering or letting them get pot-bound, and you are sure of grand specimens, provided you begin with seed worth the pains you purpose to bestow upon it.

To have a succession of fine plants, sow the first lot in a hot-bed in March, and sow again in April, May, and June; and as each lot comes on, you may select the forwardest, and allow them to bloom early, and prolong the others for the production of grand specimens. If the plants of each sowing were divided into two portions, one lot to be allowed to bloom three months after sowing, and the remainder to be grown on for another month or six weeks, you would have a splendid succession of both border and specimen plants, the size of the plants and time of blooming being so completely under control.

The soil for pot specimens should be two-thirds loam from rotted turves, and one-third well-rotted dung, or one-third hazelly loam that has been ridged up all the winter, one-third leaf-mould, and one-third powdery dung. As fast as the plants come from the seed-pans, prick them into the smallest pots; when they fill these with roots, and before they get pot-bound, shift to sixties, then again to forty-eights, then into thirty-twos for blooming. They should have greenhouse culture till they come to the last shift, and may then be put out on a bed of coal ashes on an east or west border, so as to have morning or evening sun, but be sheltered from the fierce mid-day heat. The compost at the last potting should be very rich; well-rotted cow-dung, with a little sand added to the loam, will, with plenty of water and liquid manure, help them to set their buds well and bloom strong. At every potting they should be stopped all over, and if they show bloom-buds before they are as large as you want them, take off every one, or allow one only to open to prove the sort; and if of good substance, well doubled, and a desirable colour, take it off immediately after it has opened, to prevent it setting for seed. Search the plant well, that there are no other buds left, and grow on again for a month, and then let them bloom in their own way. The blossoms ought to be as large and waxy as double camellias, and the plants perfect trees on stout stems, and without a single gap anywhere in the filling out of the side-branches.

PROPAGATING PIT FOR AMATEURS.

BY MR. H. HOWLETT, OF WHITWELL.

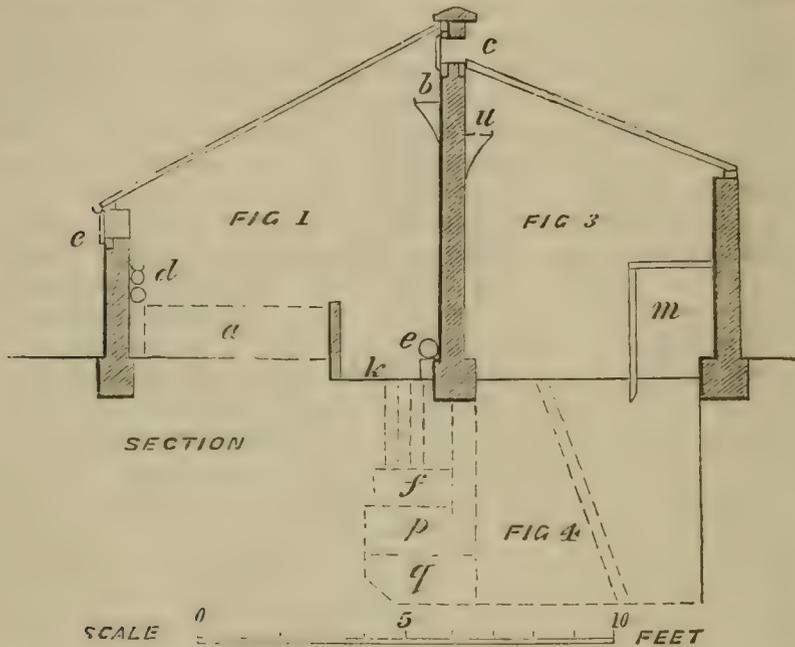


THE accompanying plans represent a suitable pit for amateurs, who delight in having a few choice things of their own raising. Let them not think, on looking at this somewhat prolix plan, that a great expenditure and a vast amount of skill are necessary to realize what is here represented; for that is not the case, as I hope presently to show. The plans have been designed in such detail in order to simplify the labour of the builder; and it is estimated that the whole cost should not exceed £20, and, when carried out, would form a complete *multum in parvo* for the gardening amateur; and, as the amount of the various materials is given, it is hoped that from such data little trouble will be experienced in ascertaining on the spot the exact cost of the erection; for as prices differ according to the distance the materials have to be carted, etc., a list of prices given here would not be found to answer for every locality. Fig. 1 represents the ground-plan and section of warm-pit, in the back of which is a path, *k*, a bed for tan or leaves, *a*, in which roses, lilacs, azaleas, rhododendrons, as well as a supply of hyacinths, narcissus, etc., may be forced during the dull months of winter; and in summer, achimenes, gloxinias, and many of our glorious stove-plants may be had, as well as a few pots of nice strawberries on shelf *b*. The roof is a fixture, and ventilation is secured by three openings back and front, each eighteen inches by nine inches *c*, over which slide boards in a groove, and which are connected together by means of a stout wire, running from one to the other, with a handle at the end, so that all may be opened or shut at once by merely pulling or pushing the handle. The ends of this part may be either all brickwork, or the front wall returned; and above that may be glass, according to the taste of the builder. The latter would be the best-looking plan, but would cost a trifle more than brickwork. Atmospheric heat is obtained from two 4-inch hot-water pipes *d*, the flow rising at *g*, and the return descending to boiler at *i*, and flue formed with 9-inch drain-pipes. I would here remark that wherever an elbow occurs in this kind of flue, it is well to use a few bricks, covering with a pavement, the removal of which at any time will enable a flue-brush to be got in for cleansing the flue. It is also to be remembered that a flue always acts best when the furnace is sunk considerably lower than the line the flue traverses, otherwise the air stagnates in it, and causes the smoke to rush out at the furnace door.

For the heating of these a very small boiler will do, and which may now be had second-hand of the great London bothouse builders for a trifle, as they are removing numbers of them to make way for the "one-boiler system;" thirty-six feet of four-inch pipe, two elbows, one syphon, and a supply-cistern, nine inches square, for fixing at *h*, will be required for Fig. 1; also, two diminishing T pieces, one stop-valve *l*, one two-inch syphon, and eighteen feet of two-inch pipe, for Fig. 2; a furnace-front and bars may also be

bought second-hand, and observe to put in small soot-doors opposite the principal flues for convenience of cleaning from soot, and these, though their cost would be trifling when new, might be had second-hand.

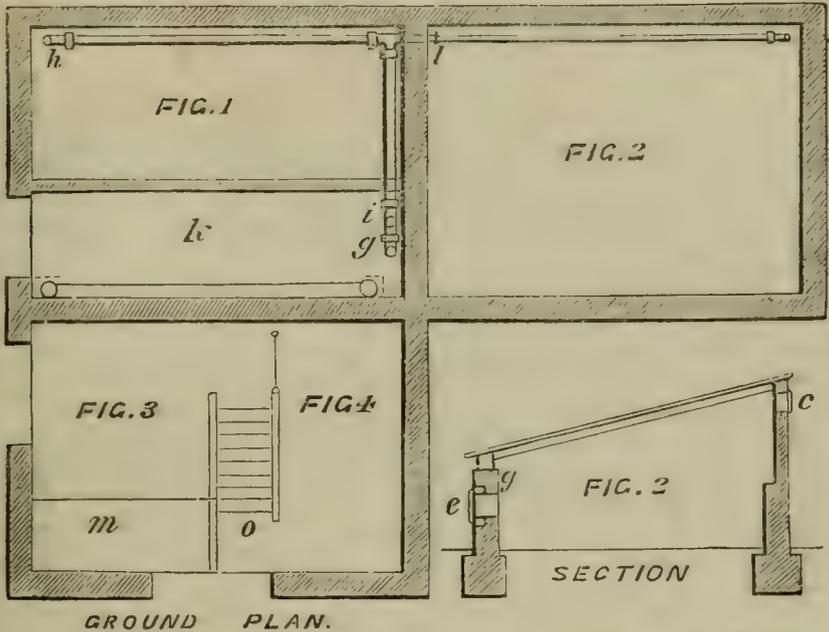
For the building must be provided 4000 red bricks, 250 white bricks for floors, 10 feet of coping-bricks, one chaldron, or 36 bushels, of lime, and three loads of sand, and 20 feet of 9-inch drain-pipe for flue and chimney.



Fifty-four feet of wall-plate, $4\frac{1}{2}$ inches by 3 inches, for the various roofs to rest upon; and if the ends of the pit, Fig. 1, be only bricked up as high as the front-wall, and the rest part glass, about 14 feet more will be required; also, for the jambs and lintels for two doors, 34 feet of the same scantling, making about 102 feet.

For the roof of Fig. 1, 180 feet will be required; and about 40 feet of 3 by $4\frac{1}{2}$ -inch scantling to lay into the walls as bond-timber. For the pitch of the roof and ventilators about 32 feet of 1 by 9-inch board for shelves *b*, *u*, and ventilators, *c*, five iron brackets, ditto a few feet of spline for ventilators, and $\frac{3}{8}$ -inch iron rod for the same; a ladder *o* for stoke-hole, one door and threshold for potting shed, Fig. 3; also one door, partly glass, and threshold for Fig. 1, two stakes and two pieces of rough board for potting-bench *m*; 70 feet of scantling, $2\frac{1}{2}$ by 3 inches for spars to roof of Fig. 3; a few feet of pantile lath for ditto, and 100 pantiles; three well-glazed 2-inch lights for Fig. 2, which can be bought ready-made and seasoned of any of the hothouse builders, these being the only parts, except the door for Fig. 1, that requires a first-rate joiner to execute; 100 feet box of glass of the exact size required can also be had of the London houses, and which would leave plenty in hand for repairs. Anti-

corrosion paint, the best for out-door work, with directions for using, can also be bought with the glass, as well as a stone of putty, or the latter can be made by any labourer, but is better if made some time before using. A window of some kind, which will serve for lighting Figs. 3 and 4, must be provided.



Having enumerated the principal materials that will be required, it remains to make a few remarks only; namely, that in constructing the back wall remember to turn an arch where the boiler is to be fixed, to prevent the necessity of weakening the structure by cutting away; also to see that at least one of the hot-water pipes has a saddle cast upon it, for supplying moisture to the atmosphere; *f, p, q*, and the dotted lines Fig. 4, indicate the position of the boiler, furnace, and ash-pit under the building. This plan, if properly carried out, would secure both a useful and durable structure.

SPECIMEN MUSK PLANTS.



PLANT which is so universal a favourite, I am surprised more pains are not taken to make it more attractive in form, instead of its being allowed to run straggling and weakly, as we mostly see it. It is capable, with assistance, of doing more than many people may imagine.

With a view to induce improvement in its growth, I would suggest that prizes be offered at our exhibitions—say, for three best pots. I am not an exhibitor now, but if you will kindly allow me a

little space, I will, for the guidance of others, give a hint or two, which are easily carried out, and will repay those who adopt a plan I tried some time since as an experiment.

The roots of musk, like those of mint, run under the surface of the soil, which, by continued watering, loses the nourishment so essential to the plant.

Cuttings, well grown, make much better plants than those obtained by division of the roots.

My method is to take a vigorous young cutting, well rooted, plant it in about four inches of a rich compost at the bottom of a half-peck flower-pot, placed in the warmest part of the greenhouse, where it will grow rapidly, pinch out the leader, and as it grows I frequently add more soil, until the pot is filled to within an inch of the top; by this time the pot is well filled with roots which have struck out from all parts of the plant thus buried, hence it grows more vigorously than when it has only a few roots running under the surface. I place a number of neatly-cut sticks about two inches apart all round the edge of the pot, draw and tie them together at the top, thus forming a cone about eighteen inches high above the rim. I then take some fine matting, pass it round each stick, commencing at the bottom, and as the plant grows, continue to place these bands round to keep the foliage inside. As the flowers make their appearance, I take them off until the trellis is nearly filled, which will not be long, for the plant may be almost seen to grow. I then let it bloom at will. A frequent turn of the pot will prevent drawing to one side.

I now let the shoots which come through the trellis fall down round the pot, which will soon be almost invisible; the whole then presents a most beautiful pillar of about two feet in height, covered with flowers of a larger size than commonly seen on musk, and not a stick of its support to be seen; by this time it requires a little assistance with clear manure water, not too strong. I should also say that frequent syringings with chilled water is of great and almost essential service.

I once sent six of them to a flower-show, and they were the admiration of every one there; many inquired if it was not a different variety from the common musk. This may not be a new plan, but I have not seen musk grown thus by any one, and would advise lovers of this favourite of mine, where practicable, to try the effect.

R. J.

SPOTTED ROSE LEAVES.—*Captain Bonner*.—The microscope reveals a dense growth of fungus on your rose leaves, and the rapid spread of it proves that circumstances are favourable to fungi, probably a damp atmosphere when it first began and woody rubbish in the compost not quite rotted. Roses are particularly liable to attacks of fungi, both on the leaves and at the root, and one fruitful cause is the presence in the soil of chips of wood, dead stick, and other ligneous matter not thoroughly decomposed. Among these bits of half-rotted wood fungous threads are developed, which appear like gossamer films, and as soon as these threads extend to the roots of the tree they sooner or later kill it. We can only suppose that you potted your plants in compost containing fragments of wood of some kind or other, swept up with the leaves or mixed with the manure.

WINDOW GARDENING.

BY JOHN R. MOLLISON.

(Continued from page 142.)

SELECT FLOWERING PLANTS SUITABLE FOR WINDOW GARDENING.



E have now arrived at a very advanced stage of our operations. We understand how to grow our window flowers to the best advantage. I will now select a few of the most suitable plants for taking under your care; and for the sake of those who have the ambition to grow some of the rarer kinds of plants, I will make my selection pretty extensive. The acknowledged leaders of window plants are the universal geraniums and fuchsias. Their beauty and easy management cause them to be general favourites, and I will begin with them.

Scented-leaved Pelargoniums.—Lady Plymouth (variegated), Pheasant's Foot, Fair Emily, Fair Helen.

Large-flowering Pelargoniums.—Bonnie Charlie, Charles Turner, Rifleman, Queen Victoria.

Fancy Pelargoniums.—Bella, Miss-in-her-Teens, Duchess of Somerset.

Golden Tricolor Geraniums.—Mrs. Pollock, Lady Cullum, Sir Robert Napier.

Silver Tricolor Geraniums.—Prince Silverwings, Lass o' Gowrie, Fascination.

Bronze Geraniums.—Her Majesty, Prince of Wales, Reine Victoria.

Ivy-leaved Geraniums.—L'Elegant, Duke of Edinburgh, Fairy Bells, Alba grandiflora.

Double Geraniums.—Casa Grey, Scintillant, Maria Lemoine, Aline Sisley.

Zonal Geraniums.—*Red*: Vesuvius, Corsair, Anna Pfitzer, Wellington. *White*: Madame Vaucher, The Bride. *Pink*: Amaranth, Blue Bell, Delight, Beauty. *Variegated*: Madame Rendatler, Gloire de Corbeny, Seraph, Amelina Grussea.

Fuchsias.—*Single red*: Black Prince, Wave of Life, Weeping Beauty. *Single white*: Lustre, Rose of Castile, Starlight, Eglantissima. *Double red*: Marksman, Avalanche, Harry Williams, Sir C. Coutts Lindsay. *Double white*: Mrs. H. Cannel, Carry Symes, Smith's Avalanche, Princess of Wales. *Various*: Alba, Coccina, Crown Jewels, Sunray, Gracilis.

Cinerarias.—Splendid flowers when in full bloom. The great difficulty for a window gardener is to grow them well. It is best to purchase them full-grown, with the flower-buds at the bursting. Keep them properly watered.

Calceolarias.—The same may be said of these as to rearing them.

They are gorgeous flowers for a window. Purchase young plants ready for potting, or raise your plants from cuttings.

Primulas.—The *Primula Chinensis*, or Chinese primrose, is a beautiful window plant, flowering during the winter months when we have little else in bloom. They are difficult to raise from seed unless you have a command of heat. You can purchase seedlings ready for potting at a moderate price. There are several varieties, red and white, single and double; and of late years a race of beautiful named varieties have come into great favour. Several of the hardy primulas are well deserving pot-room in your window, notably *Primula cortuosides* and varieties, and *Primula Japonica* and varieties.

Petunias are a lovely class of plants, suitable for windows. They can be raised from seeds or cuttings, and are of easy cultivation. Treat them the same as fuchsias. The following are a few of the best named varieties:—*Double*: Eliza Matheu, Garibaldi, La Neige, Don Quixote, Elegant, Singularity. *Single*: Attraction, Butterfly, Evening Star, Hebe, Keepsake, Unique.

Calla Ethiopica, or Lily of the Nile, is a splendid window plant, having large handsome green foliage, and large trumpet-like creamy white flowers. It is a general favourite.

Hydrangea Hortensis is a noble window plant and a general favourite, bearing large trusses of flower, which last a long time. There are several varieties. The variegated one is very pretty.

Begonias are a very extensive class of plants, and all of great beauty. Several varieties are very easily grown, such, for instance, as the one commonly called the *Bleeding Heart*.

Astilbe Spirea Japonica.—This is a very graceful plant when in foliage and flower. It casts its foliage when flowered out, and is a spring-flowering plant.

Coleus.—Here we have a truly gorgeous class of plants, the foliage having all the brightest tints of yellow, red, crimson, and purple. They are tender plants, but do well in a window if kept from cold draughts and well watered. They can be obtained at moderate prices after May.

Lobelias—Blue and White.—Lovely little flowers, among the universal favourites. They are easily raised from seed or cuttings, and plants are very cheap.

Statice.—A pretty pot plant, with everlasting flowers, suitable for window cultivation. There are several varieties.

Saxifraga.—There are a great many varieties in this class. The one commonly called *Aaron's Beard* is a splendid window plant for hanging basket work, and a general favourite.

Heliotrope, or Cherry Pie, is a highly-scented flower, and a favourite with many. It makes a nice pot plant treated the same as fuchsias, and is very cheap.

Lemon Verbena.—This is another highly fragrant plant, one of the universal favourites, and of easy cultivation in a window.

French Lavender.—This is also a very fragrant plant, with small, prettily-cut leaves, and of easy growth from cuttings.

Myrtle.—A very pretty greenhouse evergreen shrub, suitable for

window cultivation. The small-leaved variety is the best for windows, being dwarf.

Orange.—Sow a few seeds of orange in a pot, and you will soon have some nice little plants.

Cuphea Platycentra.—This is an old-fashioned bedding and greenhouse plant, much like a miniature fuchsia, with small yellow-reddish flowers. A very pretty plant for a window. Treat it the same as fuchsias.

Musk.—Every one knows this flower. It is a universal favourite for its strong musky fragrance. It is very common, and easily grown.

Myosotis, or Forget-me-not, makes a lovely pot plant. There are several varieties of blue and white, easily raised from seed.

Mimulus.—This is another very pretty flower. Its large, open blossoms are beautifully spotted and striped. It is easily raised from seed or cuttings, and makes a good window plant.

Mignonette.—The great favourite of everyone; of a delicate fragrance and easy cultivation. Everybody's flower.

Stocks.—A grand class of summer annuals and perennials, first-class for window-boxes, and easily raised from seed.

Asters.—A companion to the stocks, requiring the same treatment, and easily raised from seed. Plants are very cheap, and you are surer of your stocks and asters by purchasing plants than sowing seed.

Pansies and Violas.—Universal favourites; a very varied class of plants, and splendid for window-boxes. They are easily raised from seed or cuttings. Plants are very cheap.

Arabis.—Green and variegated; are very good window-box plants for spring flowering, and they rank with Wallflower and Gilliflowers for spring display.

Here we will close this article, and in our next we will select a few of the best bulbous roots and plants, and plants suitable for small rockeries. It is difficult to select from so many plants of suitable habits, and there are many that would grow well in windows I might mention. Most of the above list will do equally well in pots or boxes. Annuals of suitable kinds abound in great variety—Scarlet Runners, Nasturtiums, Tropæolums, etc., for training round your windows; Candytuft, Nemophila, Virginian Stock, Indian Pinks, etc., too numerous to mention, for your window-boxes. Seed packets of annuals are very moderate in price.

SOLANUM CAPSICASTRUM.—*P. M. S.*—This must be treated as an annual. When the fruit shrivels throw it away and keep up a succession of plants from seed. The ordinary mixture used for calceolarias will suit it admirably. Sow in dung-heat, and grow the plants fast in full sunshine, and give plenty of air and water during the summer.

PLANTS FOR AN ARCHED TRELLIS.



IN a recent inspection of an interesting garden in our neighbourhood, we were much struck with the admirable effect produced by a judicious employment of climbing plants trained arch-wise over the paths and parterres, and inwardly resolved to call the attention of our readers, at the earliest moment, to the advantages and charms of such an arrangement.

We must, however, state at the outset that it is only in gardens of some size that this mode of training can be adopted to any extent, for as the object in view is the augmentation of the general effect, and not the concealment of the dwarf plants, it follows that the end will hardly be obtained if the arches are too numerous, or too obstructively disposed. The smallest garden will, however, offer space enough for the introduction of a few climbers trained in this form. Most of our climbing plants unfortunately lose their leaves in winter, and the trellises then present a naked appearance; we think, however, that it would be quite practicable to cover a few of them with ivy, which could be kept closely clipped, and would be speedily concealed in summer by the rapid growth of many of the herbaceous climbers.

Among the plants more especially adapted to this purpose we may name, first, the *Periploca greeca*, which, although deciduous and producing flowers of an inconspicuous character, is remarkable for the luxuriance of its handsome foliage, and it is of very rapid growth. It is perfectly hardy, and increased with facility by cutting.

The *Aristolochia siphon* is an equally useful plant, with highly curious flowers of considerable size, but they are not generally produced freely; its fine leaves, however, give it a value which is unaffected by this circumstance. This too is quite hardy, and succeeds in almost any soil.

The *Eccremocarpus scaber*, is a well-known herbaceous climber, producing an abundance of tubular orange flowers throughout the summer and autumn. It is very suitable either for training on a single rod, or for covering a series of arches. It is quite hardy in light dry soil, but in wet soil needs a little protection.

Several of the blue-flowering *Clematis* afford a pretty contrast to the tint of the preceding. That we would particularly recommend is the *C. Hendersonii*; but the varieties of the *C. viticella* and the *C. crispa* are almost as good.

The *Ampelopsis quinquefolia*, although so common, ought not on this account to be overlooked, for there is much character in its foliage and habit, and the bright red tint it assumes in autumn is a sufficient compensation for its insignificant flowers. The honeysuckles will afford several most interesting plants, and none are more desirable than the common *Lonicera caprifolium*, and its Italian variety, *L. sempiflorens*, which blooms for a longer period. The delicious fragrance of both is well known. The evergreen species, *L. sempervirens*, is scentless, and on this account is less grown. The trumpet-flower,

Tecoma radicans, and the allied *Bignonia capreolata*, are both showy, hardy, ligneous climbers, nearly evergreen, producing when well established a profusion of flowers, especially the latter species; it is, however, not quite so hardy as the *Tecoma*, but only suffers in severe winters.

But the most truly ornamental plant of this class is, without doubt, the *Wistaria* (*Glycine*) *sinensis* of which we have already spoken in high praise.

In no situation is it more effective than when trained over an arch, at a height of seven or eight feet from the ground; and the new white variety of this splendid plant is equally beautiful. The *Lardizabala biternata* will, no doubt, be eventually available for this purpose, though at present it is too rare, and the plants too small, for us to affirm that it will prove sufficiently hardy. And lastly, we have the numerous varieties of the Ayrshire and Evergreen Climbing Roses. These charming plants are indispensable in every garden, and are among the cheapest of all the hardy climbers. Of the Ayrshire Roses, which are deciduous, the Ayrshire Queen, dark purple crimson; Dundee Rambler, white, edged with pink; Queen of the Belgians, creamy white; Ruga, pale flesh, large double flowers, are four good varieties. Of the Evergreen section, the well known Felicité Perpetuelle, with creamy white flowers; Leopoldina d'Orleans, white, shaded with rose; and Princess Marie, rose pink, may be regarded as among the best. The Multiflora roses, Grevilleii, and Laura Davoust, may also be added, and many others which our space will not permit us to name; and to these, the *Hop*, the *Cobæa scandens*, the *Calystegia pubescens*, and the different species of climbing annuals, such as the Canary Flower and Major Convolvulus, can be appended when a considerable number is required. With regard to the arrangement of an avenue of climbers, we would suggest that those which are chiefly remarkable for their foliage should alternate with the species possessing conspicuous flowers.

The mode of training is too simple to need any detailed explanation. In the case of a single arch, nothing more is necessary than a stout iron rod, of sufficient length that, when fixed, the top of the arch will be from seven to eight feet from the ground; the two extremities of the rod being each secured to a square block of wood, partially buried in the ground, and charred outside to prevent decay. A series of these arches can be easily converted into an arcade by attaching horizontal rods, or a network of wire; and in whatever way they are combined, a coating of paint will be desirable on the score of preservation. Not only may every part be thus converted into a "hanging garden," but even the beds may have occasionally their attractions enhanced by a union of the perpendicular with the ordinary style of gardening.

JUNE WORK IN THE ROSE GARDEN.



THE possibility of planting roses in any week of the whole year having been proved, we may now remind our readers that this is as good a season as any for furnishing a rosarium, though it is not usually so regarded or described. There are many blights that affect the rose, but the greatest of all is the nursery system of propagation. How many of the roses planted last autumn are now poor scrubby things, like worn-out mops, or puny imitations of dwarf bushes that refuse to grow, and when their flowers appear it is with some twist of the bud that indicates constitutional weakness. Nevertheless, for plants carefully worked on young lusty briars or Manettis, and duly pinched in when forming their first shoots, the autumn is the best time for planting, because all winter the roots are at work, and a good summer bloom is the proper result. But suppose a man with a passion for roses has just made up his mind which of the new ones he will add to his collection, or suppose a new garden where it has been tremendous hard work for months past to get things in order, and the season ordinarily used for planting has been lost, it is not too late now to plant roses in either case, and we will venture to say that under certain circumstances it is the best season of the whole year.

There is one thing certain about roses planted in April and May from nursery pots, and that is, that a good many always perish, though there are few writers who have the courage to acknowledge it. People order in so many of such and such roses. The plants arrive in due course, and very shortly afterwards they are turned out to take all chances of weather. They were perhaps worked on Manettis during winter from forced plants and forced stocks, and to meet the demand in spring were sent out before the junction of the two barks had been fully effected, and being tender through having been "pushed," they are quite unfit to endure the assaults of the weather in cold ground, and with occasional morning frosts; and, *par consequence*, some of them die, some stand still a few weeks and then grow with vigour, and some linger between life and death, and are never worth the room they occupy. The Manetti is a good stock, but it is made the worst by the system of forcing to which it is subject in the nursery mode of propagating. The roses are manufactured *to sell*, and about nine-tenths of them are very different to plants worked in summer-time, on stocks in the open ground. When these die we may blame the possessor; when death happens to the pot plants sent direct from an atmosphere of 70°, and warranted fit for immediate planting out, we must blame the system by which they are manufactured and the strength driven out of the plant by stove treatment.

"But there are no others to be got," so says the rose amateur, who burns to complete his lists of selected varieties, and to whom the "new roses" are as important as the new fashion in bonnets to a blushing belle. Unfortunately that is almost true; the new roses are hurried into size for sale, and when sent out there is something of a plant to look at, and very often much more to look at than the

price would lead one to expect. There the purchaser must take his share of blame. The trade cannot get up new roses on their own roots at the price which competition fixes, and the hunger for cheap things causes amateurs to prefer plants at three to five shillings each, one-third of which are scarcely worth having, rather than pay a shilling or so more and have plants fit for any purpose, with the vigour of their own life in them. With old roses the only excuse for working them on Manettis in a forcing temperature is to produce them wholesale at a cheap rate; and without opening again the question long since settled, we have only to say on this subject that when roses are advertised it should be stated what their roots consist of, and before people order them they should inquire what roots are obtainable, and as a rule give the preference, and an extra price, for roses on their own bottoms.

Stocky plants in 60 or 54 size pots are to be had all the year round, and this is as good a season as any in the year to plant them out for beds of dwarfs, whether on their own roots or Manettis. If they have been pushed during the early months of the year, the ground is now warm enough for them to take to it at once, without any long process of hardening; and the conditions essential to success are to obtain plants that have filled their pots with roots, or that (if worked) are healed at the junction, to plant them in well-manured soil, eighteen inches or two feet apart, according as they are moderate or robust growers, and to give them plenty of water during dry weather all the season.

You remember well the disastrous season of 1860, when it rained, rained, rained, as if the world had been doomed to suffer another deluge for its sins. The first bloom of roses that year was magnificent. The rain just suited them; it is evident that the frequent recommendation to give roses plenty of water, especially overhead, is no figment of the imagination. Now the work of the season among roses consists first in giving them abundance of water. The drier and hotter the weather, the more are they infested with fly. The more rain, or the more artificial rain from hydropult or engine, the less will they be troubled with this horrible pest, and if sent through the heads of standards with some force, every aphis will be hurled to limbo, and the bloom buds will plump up by absorption, and give richer and larger blooms. We have advised hand-picking for the grub, and never was it more needed than this season. Now the enemy that awaits them is the fly, and though water is not poison to it, plenty of water and plenty of aphis rarely go together; one must give way; and it is the rose-grower's business to see that the fly is kept down by a process which enhances the beauty of both foliage and flowers.

The blooms are opening well and early this season, and we fully expect that the rose shows which are fixed for the earliest dates will have better contributions than those that come later. When the first bloom is nearly over, prune in slightly, and mulch with either rotten dung or wood-ashes and guano, a bushel of the first to a peck of the last, and a peck of the mixture to be spread in a circle of three feet in diameter round the stem of each tree; half the quantity will suffice to spread around dwarfs: but half-rotted dung is best where

appearances are not of much consequence, as it is so retentive of moisture and keeps the roots cool.

Those who plant now must not touch standards, unless they can be got in pots. We have frequently turned standards out of pots in the height of summer, and found that frequently syringing for a fortnight afterwards was all they needed to help them to take hold of the ground. Dwarfs in 60, 54, or 48 pots, the pots full of roots, will turn out without damage to a fibre, and if the ground is mellow and well manured they will give a fine bloom in the autumn; but with this object in view it would be well to take off all bloom buds when planting. The best bed of roses we ever had was planted on the 3rd of June; it consisted of Jules Margottin, in three inner circles, and General Jacqueminots outside, all on their own roots; they were not allowed to bloom till August, and then continued in bloom until their buds were frozen before they could open, and the next season made tremendous growth. Anybody can tell if a rose is on its own root or worked, for the scar of a worked rose remains a long time at the collar. This scar should be planted below the surface, in order that the rose may form roots of its own, and a slight notch in the bark with a sharp knife just above the work will hasten the process. We are not inclined to quarrel with Manettis, Briers, Boursaults, or any other stock; we have always had fine plants of all kinds as the result of giving each the requisite management. But own roots are best for ninety-nine out of every hundred varieties we possess, and all we insist on is that nurserymen should state in their lists what the roots consist of, and that purchasers should know when ordering roses what sort of roots they are to expect. S. H.

THE MIMULUS AND ITS CULTURE.



THE well-known monkey-flower is entitled to much more attention than is usually bestowed upon it by amateur florists, both as a useful decorative plant, and as a good subject for exhibition. It has been declining in popularity of late years, owing, probably, to the increased attention paid to what are called "bedding plants," which absorb so much of the money and time of the present race of gardeners. But it has a sufficient number of admirers to entitle it to be called a garden favourite, and is highly prized by nurserymen who grow for market, as, from its rapidity of growth and profusion of bloom, it makes a good return for outlay. The name is said to be from "Mimo," an ape, bestowed upon it because of the ringent or gaping mouth of the flower. The merest novice in botany will at once discover that the *Mimulus* belongs to the natural order *Scrophulariaceæ*, or Figworts, in which are grouped the pentstemon, calceolaria, antirrhinum, and other flowers similarly constructed. There are many useful species, and a few good varieties, which it

will be desirable to enumerate, and in naming them we will add a few words on culture.

HARDY SPECIES.—*M. rivularis* is the best of these. It makes a brilliant display of golden yellow flowers during June and July. Once planted on damp loam, it will spread to a larger patch every year, and acquire a most important character in the decoration of the garden. At the foot of a rockery or in the common border, it is quite at home. As it dies down in autumn, the ground where it is planted should not be disturbed.

Glabratus, yellow ; *guttatus*, striped ; *ringens*, blue ; and *propinquans*, yellow, are all useful for the border and damp parts of rockeries. *M. moschatus*, the "musk mimulus," is very hardy as an annual, usually appearing plentifully in places where it was planted out the previous year from self-sown seeds. But in mild winters the roots also survive and throw up shoots in spring. The best way to grow musk is as a frame plant. The soil should be light and rich, and the pots in which the plants have grown should be put aside, so as to be safe from frost, and kept moist till next spring. Then as soon as they begin to sprout, divide them and pot separate small pieces in fresh soil, in small pots, and place on a gentle bottom-heat, or in a warm corner of the greenhouse. They will soon fill the pots with roots, and must never be shifted. By liberal culture musk may be grown to a height of three or four feet, and be one mass of bloom the whole season. It may be trained upright by means of a few light stakes put round the pot, and connected with strands of bass all round, or if planted in a basket, may be allowed to hang down in festoons. The great secret of growing fine specimens is to use a rich soil, shade moderately, and give abundance of water.

CULTURE OF GREENHOUSE SPECIES AND VARIETIES.—They may all be treated as annuals if sown early in a moderate hot-bed, and as soon as up pricked out in rich light soil, and grown on in good greenhouse temperature. For a good bloom the same season, the latest time for sowing is the last week in February. As soon as the seedlings have made a good start after being potted singly in thumbs, give them rather more water than would be safe to the generality of plants in so young a state, and shift on as fast as they fill the pots with roots. When they are in 48 size pots, place a saucer under each, and let that saucer be always full of water. They will drink it up, and thirst for more, and grow with great luxuriance and make fine flowers. They will need shading when in bloom, and plenty of air, in fact, they may be treated nearly the same as herbaceous calceolarias from first to last, but must have more water. As the stems are very soft, and the flowers heavy, they must be neatly staked before they get untidy. As it is advisable to render the supports as nearly as possible invisible, neat painted sticks should be used. We have been accustomed to use lengths of No. 1 iron wire, painted a light green, for this purpose, and found them preferable to wood. When the plants are in bloom, any of superior excellence should be marked with tallies to propagate from. During August and September, take cuttings of three joints each, place half-a-dozen of these round a 48 pot in a compost of

half leaf-mould and half loam, with an addition of silver sand, sufficient to render the mixture light and friable. Plunge these pots in a gentle heat and keep close till rooted, which will be in about fifteen days, then pot singly in 60 size pots, and in these pots winter them. When grown in quantity they are usually wintered in the cutting pots, and have a shift at the end of February or early in March, into 32 size pots well drained and filled with a mixture of leaf-mould, turfy loam, and rotten dung equal parts. At the end of April or early in May these may be again shifted in pots of 12 size, in which to bloom. They will require abundance of water, and may have saucers to keep the roots constantly in action. Any required extra fine for exhibition, should have liquid manure once a week, but without this help the plants will flower finely if grown as otherwise directed. Of course the cultivator may shift on seedlings to the same size pots as plants from cuttings, but generally it is best to flower seedlings in 48 size, and grow into specimens only selected varieties known to be worth extra culture.

PROPERTIES AND HYBRIDIZING.—The attention of the cultivator should be chiefly directed to the *form* of the flower; in habit and colour it can scarcely be improved. Flowers that collapse are not worth growing, however fine their colours, except it be to furnish pollen for hybridizing flowers of good shape. The broader the segments, and the smoother the edges, the higher will the flower rank in the eye of the florist, and deservedly so. In selecting varieties to propagate from cuttings, or to produce seed, give the preference to those that exhibit an expanded flat surface, with small spaces between the petals. As regards colours, these should be bright and decided; the markings sharp, on clear grounds; yellow is the most common hue, and white the most rare. In every endeavour to improve the mimulus the hybridizer should select for the seedling flowers those that have thick, broad petals, and that most nearly approach a circular outline; and for pollen, flowers that are the most brilliantly and regularly coloured. If the pollen flower is also well formed, there is the greater chance of a pod of seed worth saving.

GREENHOUSE SPECIES AND VARIETIES.—*M. cardinalis* is the parent of the best show varieties we possess. The original species grows to a height of two feet, and produces fine scarlet flowers. Seedlings vary to all the shades of rose, ruby, maroon, pink, and crimson; and if crossed with *roseus*, *Smithii*, and *variegatus*, some very showy strains may be secured. *Cardinalis* is a native of California, and was introduced in 1835. *M. roseus* has small flowers of regular shape, with yellow throat and bright rose petals; it is one of the most beautiful in cultivation. Mr. Douglas sent seeds of this to England from North California in 1831, and it was first flowered in the gardens of the Horticultural Society. This is strictly a perennial, and is not so easily cultivated as most others of the genus. The best method of treatment is to keep it constantly in the frame or greenhouse, potted in turfy loam three parts, sandy peat one part, and leaf-mould one part, and the pot always in a pan of water, except during cold winter weather. It is easily increased by cuttings, and occasionally ripens seeds. *M. variegatus* is a native of

Chili, introduced by the Messrs. Loddiges. This is described in some works as white and rose, but this is not correct. The throat is a pale canary, and the segments of the flower are deeply tipped with rosy purple, the remaining parts being a rich gold yellow. This species seeds freely, and is not at all difficult to cultivate. *M. glutinosus* is now a rare plant. It is the most shrubby of all, and well worth recovering for crossing with good varieties of weak habit. *Smithii* is a fine hybrid, raised some years ago by Mr. George Smith from *rivularis* as the male parent, and *variegatus* as the female. The flower is large, the ground colour orange yellow, at the tip of each petal is a large brownish, crimson blotch, and there are small spots of the same around the throat.

Twelve Finest Exhibition Varieties (Downie, Laird, and Lang).—Alexander Haig, light lemon, dark maroon margin; Danecroft Beauty, white with crimson blotches; *Distinctus*, lemon, deep crimson margin; Grand Sultan, pure white throat, black margin; Lydia, bright yellow and crimson; *Magniflora*, white and cherry; Mrs. Dickson, yellow, crimson blotches; Mrs. E. Lockart, white and maroon; Raphael, pure gold margin and deep claret; Spotted Gem, gold and maroon; Sultan, yellow and purple; Symmetry, straw, spotted with cherry red.

MIMULUS FOR BEDDING.—All the hybrids are adapted for bedding, and, as a matter of course, the dwarfest are most easily managed. On hot, dry soils they are useless; the foliage loses its proper colour, and the plants are eaten up with red spider; but on a cool, moist loam, and in damp places, where many kinds of bedders would be unhappy, the mimulus is quite at home. When any selected hybrids are grown for bedding, they may be kept in their cutting pots till May, and then be turned out and sheltered from the sun, and kept well watered till rooted; generally the colours come much finer out of doors than under glass; this is especially the case with *rivularis*, which is a charming plant for a mass, but unfortunately fugacious. Good beds may be made of seedling plants from February sowings, but there will be no uniformity of colouring. *Floribundus*, *parviflorus*, and *moschatus* make better clumps when grown in moist and shady beds of peat, but the last named should be used rather for its odour than its colour; for however profusely it may flower, it is by no means effective in a mass. It is otherwise with *M. cupreus*, which is one of the finest bedding plants we possess. It is perfectly hardy, and can be grown from either seed or cuttings, and requires precisely the same treatment as *Lobelia speciosa*. It grows four to six inches high, and produces a perfect blaze of fiery flowers. A damp, shady bed suits it best.

ON THE CULTURE OF AQUATIC PLANTS.



THE aquatic plants of the Eastern hemisphere, from their elegance and beauty, rank as objects of no mean interest in the catalogue of vegetable forms. Some of them are allied by their similarity of structure to the Algæ, as *Zostera* and *Aponogeton*, in the natural order *Fluviales*, which may be mistaken for subjects in that inferior class of vegetable organization; while, on the other hand, the noble tribe of *Nymphææ* stands unrivalled for the beauty of the several species of which it is composed. The beautiful blue of *Byblis linifolia*, the rich tinted brown of *Vallisneria spiralis*, the delicate pink of *Nelumbium speciosum*, and the highly fragrant perfume of *Aponogeton distachyon*, have each and all a deep and peculiar interest among other objects which occupy the wide domain of Nature.

The different species of aquatic plants belong to no particular order of the vegetable system, but are dispersed through the principal divisions of the natural arrangement. They are indigenous to most parts of the known world; but the British species form very conspicuous and interesting plants to deck the hardy aquarium.

Many of the species which are most difficult of culture are natives of the tropics, and require a congenial atmosphere (varying from 55° to 70° artificial heat, and up to 90° solar heat) to disclose their flowers. As they require intense light, they should be placed near to the glass. Where cisterns are used, a waste pipe is requisite to take off the water when becoming injurious to growth.

STOVE AND EXOTIC SPECIES.

LIMNOCHARIS HUMBOLDTHII belongs to the natural order *Comme-lineæ*; its name is derived from *limne*, mud, *charis*, grace. It thrives in retentive loamy soil, and produces an abundance of its bright yellow three-petalled flowers, if planted in a cistern or tank where a good heat is maintained. Introduced from Buenos Ayres in 1831.

NELUMBium SPECIOSUM, from *nelumbos*, its name in Ceylon, belongs to the natural order *Nymphæaceæ*. The delicate colour of its bright pink flowers make it a desirable object. It requires to be kept dry after the blooming season, and again excited about the beginning of February. The fruit of *N. speciosum* is supposed to be the Egyptian bean of Pythagoras. It grows in great luxuriance in the ditches, in all the hotter countries of the East; and requires intense heat to expand its flowers.

BYBLIS LINIFOLIA, named from *Byblis*, daughter of Miletus, ranks in the natural order *Droseraceæ*. It is a pretty though minute plant, with blossoms of a beautiful blue, which are produced freely when planted in a good loamy soil; but it succeeds best when placed in a shallow cistern in the stove. Native of New Holland, introduced in 1800.

DESMANTHUS NATANS, a native of China, is a beautiful and interesting aquatic, producing its singular white flowers in abundance, if

planted in a retentive soil, in a cistern where there is constant heat; while its foliage being dark green, and sensitive to the touch, forms a happy contrast with the flowers. It belongs to the natural order Leguminosæ, introduced from China in 1800.

PAPYRUS ANTIQUORUM, derived from the Syrian *babeer*, whence the Egyptian word *papyrus*, paper. It belongs to the natural order Cyperaceæ. It succeeds well if planted in a loamy soil, in a cistern of good depth, and produces its apetalous flowers in great luxuriance. It is from this plant the Egyptians made their paper, which was obtained from the pellicle between the flesh and bark of the thickest part of the stem, pressed and dried. Introduced from Egypt in 1803. [This will probably suit for planting out in the garden during the summer.]

NYPHÆA CÆRULEA, a very ornamental plant, decking the aquariums of our stoves with its bright azure blue flowers, which it produces in abundance, if planted in a loamy soil with a gentle heat, and kept constantly immersed in water. It succeeds also nearly as well in a pond in a warm situation; but if the season be cold during the time of the expansion of its flowers, they seldom or never expand so well as in a warm close atmosphere. This beautiful plant derives its name from *Nymphæ*, a water-nymph habitation, and belongs to the natural order Nymphæaceæ. Native of Egypt, introduced in 1792.

VALLISNERIA SPIRALIS, named in honour of Antonio Vallisneri, an Italian botanist. This curious and remarkable water plant grows with great luxuriance, if potted in light turfy loam, and placed in deep water in a warm atmosphere; but succeeds nearly as well in a conservatory or greenhouse. It requires to be kept cool and dry during winter, and removed to the stove in February, which causes it to produce its richly-tinted brown flowers in greater luxuriance than if kept in heat during the winter. It belongs to the natural order Hydrocharaceæ, and is indigenous to the South of Europe.

PONTERERIA CRASSIPES.—This is an elegant plant, from its singularly formed, thick petioles, bright green, smooth, cordate foliage, and spikes of lovely blue flowers. It seems almost to despise the material in which most other varieties of aquatic plants rejoice, and floats about, regardless of any fixed station in the element to which it is naturally consigned, but succeeds well if potted in rich loamy soil, and placed in shallow water in a stove. It is named in honour of Julius Pontedera, a professor of botany at Padua, and belongs to the natural order of Pontederaceæ. Introduced from Guiana in 1825.

ELODEA GUIANENSIS, from *Elodes*, a marsh, which is its natural situation. It produces its white and conspicuous flowers about the beginning of August, in a light loamy soil, where heat is kept up. Introduced from Guiana in 1820. It belongs to the natural order Fluviales.

PARKERIA PTEROIDES, named in honour of C. S. Parker, who first discovered this fern-like plant in Essequibo. Its flowers are dark brown, in a short whorl; and although they are minute, yet its serrated pinnate leaves render it somewhat interesting. It succeeds

well in loam and peat, with the roots only immersed in water. It belongs to the natural order Polypodiaceæ.

HYDROLEA SPINOSA.—This minute plant represents the order Hydrolaceæ; and its flowers vie with the intense blue of the empyrean. The stem and foliage are decked with numerous spines, as a protection to the charming buds which raise their graceful form above them. It grows most luxuriously in a loamy soil, in shallow water, and placed in a stove where heat is maintained. Its name is derived from *hydor*, water, *elaia*, oil. Introduced from South America in 1791.

VICTORIA REGINA.—This is the most popular aquatic, and most majestic in appearance: it flowers in January in its native country, Guiana. It was discovered by Sir R. H. Schomburgk, in 1837; he describes it as “a vegetable wonder.” Its immense leaves are from six to seven feet in diameter, salver-shaped, with a broad rim of a light green above and vivid crimson below. Its flowers, resting upon the water, are in character with the leaves, consisting of many hundred petals passing in alternate tints from pure white to rose and pink, about fifteen inches across. The leaf on its surface is bright green, in form orbiculate; the stem of the flower is an inch thick near the calyx, and is studded with sharp elastic prickles, about three-quarters of an inch in length; the calyx is four-leaved, each leaf upwards of seven inches in length, and three in breadth; they are thick and white inside, reddish brown and prickly outside; the diameter of the calyx is twelve or thirteen inches. The magnificent flower, when fully developed, resting upon the calyx, completely covers it with its hundred petals; when it first opens it is white, with pink in the centre, which spreads over the whole flower as it advances in age; it is generally pink on the second day after its expansion: as an enhancement of its remarkable beauty, it is also sweet-scented.

HARDY AND BRITISH SPECIES.

The aquatic plants which are cultivated in British aquariums possess considerable and peculiar attractions. The purple of *Butomus umbellatus* gives an imposing effect to British ponds, while the elegant form of *Hottonia palustris*, the “naiad of the stream,” enlivens many a month with its rosy flowers peeping from among the sedge, and the dead leaves of grasses by which it is environed. *Menyanthes trifoliata* again decks the margin of our English ditches with its interesting and lovely flowers, while the *Richardia Æthiopica*, or *Calla Æthiopica*, from the remarkable purity of its wax-like flowers, fixed on their long elastic stems, wave in graceful motion by the summer’s evening zephyr reflected in the mirrored surface of the water.

The situation best adapted for hardy aquatics is found to be in accordance with the height attained by them; and according to this feature, so must the depth of water be regulated in which they are to be immersed: thus the *Richardia Æthiopica*, *Nymphæa alba*, and *Nuphar lutea*, require a depth of from one to two feet, while the *Caltha palustris*, *Hydrocharis morsus ranæ*, *Sagittaria sagittifolia*, *Acorus calamus*, *Butomus umbellatus*, *Zanichellia palustris*, etc.,

should be planted from six to twelve inches from the surface of the water; *Hottonia palustris*, *Menyanthes trifoliata*, and *Aponogeton distachyon*, should be potted, and the pot fixed so as to be half immersed in the water. After the blooming season of the *Aponogeton* is over, and the leaves look yellow, they may be taken up and dried, and again excited in the following March. *Stratiotes aloides*, which is one of the most curious indigenous aquatics, should also be kept with half the pot under water.

As some arrangement is requisite for plants of this description, it is desirable that ledges should be made in ponds or tanks where these plants are to be grown for them to be placed upon, according to their height, and also for the blending of their colours: the low-growing varieties, being generally the more tender, should for this reason, as well as to preserve a more systematic appearance, be placed at the margin, while those of larger growth and greater altitude should be planted towards the centre. The situation for *Nymphæa alba* and *Nuphar lutea* should be either in ponds or fast currents; the two, planted together at the edge of a waterfall, will blend their noble flowers in rich luxuriance amidst the surging foam of the surrounding water. Most of the other species prefer a shady situation, and are to be found in Nature's untrodden wilds,

“Far from the busy haunts of man;”

shedding their florets of varied hues in gay profusion, as if emanating from the lucid bosom of the water from which they partially derive their sustenance, and diffusing a pleasing lustre over the margin of the willow-shaded pond.

T. D.

RHUBARB WINE, OR BRITISH CHAMPAGNE.



ROVIDE a fermenting tub that will hold from fifteen to twenty gallons, or larger if required. It should have a guard or rim on the inside, similar to that used for brewing beer, in order to keep back the husks of the fruit, and a tap near the bottom.

Take fifty pounds of rhubarb, and thirty-seven pounds of fine moist sugar. In the tub bruise the rhubarb; when done, add four gallons of water; let the whole be well stirred together; cover the tub with a cloth or blanket, and let the pulp stand for twenty-four hours; then draw off the liquor through the tap into another tub or pan; add one or two more gallons of water to the pulp, let it be well stirred, then allowed to remain an hour or two to settle, and then draw off; mix the two liquors together, and in it dissolve the sugar.

Let the tub be made clean, and return the liquor to it, cover it with a blanket, and place it in a room, the temperature of which is not below 60 degrees of Fahrenheit's thermometer; here it is to remain for twenty-four, forty-eight, or more hours, until there is an appearance of fermentation having begun, when it should be drawn off into a ten-gallon cask, as fine as possible, which cask must be

filled up to the bung-hole with water, if there is not liquor enough ; let it lean to one side a little, that it may discharge itself ; if there is any liquor left in the tub not quite fine, pass it through flannel, and fill up with that instead of water. As the fermentation proceeds, and the liquor diminishes, it must be filled daily, to encourage the fermentation, for ten or twelve days, it then becomes more moderate, when the bung should be put in, and a gimlet-hole made at the side of it, fitted with a spile ; this spile should be taken out every two or three days, according to the state of the fermentation, for eight or ten days, to allow some of the carbonic acid gas to escape. When this state is passed, the cask may be kept full by pouring a little liquor in at the vent-hole once a week or ten days, for three or four weeks. This operation is performed at long intervals, of a month or more, till the end of December, when, on a fine frosty day, it should be drawn off from the lees as fine as possible ; the turbid or muddy part passed through flannel. Make the cask clean, return the liquor to it, with one drachm of pure isinglass dissolved in a little water ; stir the whole together, and put the bung in firmly. Choose a clear dry day in March for bottling. They should be champagne bottles—common wine bottles are not strong enough—secure the corks in a proper manner with wire, etc. The liquor is generally made up to two or three pints over the ten gallons, which is bottled for the purpose of filling the cask as it is wanted.

To make a dry wine like sherry, the cask must be kept constantly filled up to the bung-hole, daily, or every other day, as long as any fermentation is perceptible by applying the ear to the bung-hole ; the bung may then be put in lightly for a time, before finally fixing it ; it may be racked off on a fine day in December, and fined with isinglass as previously directed, and bottled in March.

THE CAMELLIA.

BY AN OLD GARDENER.



OW that the bloom of Camellia is over, is a suitable time for some notes on its history and culture, as well as of its various uses as a conservatory, greenhouse, and window flower, and also of its adaptation to suitable situations in the open air. There are not many species of Camellia, and we are mainly dependent on the varieties of *C. Japonica* for the hundreds of variously coloured flowers that decorate our houses during winter and spring. *Japonica*, too, is the oldest, having been introduced to this country, in 1739, from its native country, Japan. The *Thea*, from which the Chinese manufacture the tea of commerce, is strictly a Camellia, and the botanical distinctions by which it is separated from Camellia are too slight, in our opinion, to warrant the division. It is commonly believed that *Thea viridis*, often catalogued as *Camellia viridis*, is the only plant used by the Chinese in the manufacture of tea ; but *T. Bohea* and

T. Assamensis also furnish leaves of a character suited for the same domestic purpose. The Theas, however, are far less ornamental than the true Camellias; they are all white-flowered, nearly hardy, and flourish well in a cool house, where they require as much air and very nearly the same treatment as Ericas. Specimens of the tea-shrub have been known to survive the winter out of doors near London, and, as we shall show in the course of this paper, the Camellia may also be grown in the open air, and, with some few precautions, used as a shrubbery and border plant. The species of Camellia known in our collections are Japonica euryoides, Kisii, maliflora (apple-flowered), oleifera, from which a valuable culinary oil is obtained, reticulata, and Sasanqua. Next to Japonica, Sasanqua is the most ornamental, and some of its varieties—as, for instance, plena alba (double white), plena rubra (double red), and semi-plena (semi-double)—are worth a place in any general collection; but Japonica leaves them all behind in foliage, habit, and the splendour of its flowers; and it is no wonder that its varieties have been multiplied by hundreds by careful hybridizing and the accidents of horticultural practice.

GENERAL TREATMENT.—The majority of cultivators prefer to purchase plants of the varieties that enjoy the highest popularity, and but few concern themselves in propagation either by seed or otherwise. We shall, however, offer some specific instructions on all the various modes of increasing stock, and raising new varieties, but here confine ourselves to such generalities as bear more or less on the management of the Camellia in every season of the year. The plants are now out of bloom, and are pushing their new growth; this new growth will supply the bloom-buds for next season, and the task of the cultivator is to promote that growth, and get it well ripened before the season closes. An excess of light is altogether inimical to the prosperity of Camellias; hence we see them do well in the old-fashioned dark houses, against which we are apt to level our abuse when comparing them with the structures of the present day. The buds begin to push, indeed, before the bloom is fairly out, and often under disadvantageous circumstances, for the plants may be used to decorate apartments where the air is far too dry for them. In such cases the foliage should be sprinkled morning and evening, and the roots kept well supplied with water slightly tepid, so as to prevent exhaustion till they can be got back into their proper growing quarters. The future well-doing of the plants depends entirely on the maintenance of a strictly seasonal action; they will not break and bloom at any season, like geraniums and other soft-wooded plants, but must have their time of quick growth, and a long season of comparative rest. Therefore they cannot be too soon encouraged to grow after having bloomed; and a moist atmosphere, and a temperature averaging 65° by day and 55° by night, with plenty of air, and shade from sunshine, are essential to success. In such a temperature, and with free ventilation, the Camellia will make rapid and healthy growth if frequently syringed and kept very moist at the root. Drought at this season is ruin to it; if the floor and walls are deluged with water, so as to keep the atmosphere saturated with

moisture, the growth will be more luxuriant and healthy. As soon as the foliage is well expanded, and the bloom-buds begin to show at the points of the shoots, give more air and less water; and at the end of June, or early in July, turn them out under a north wall on to a bed of coal-ashes, to ripen the wood. A moderate amount of sun will be good for them from this time to the end of the season, but it should not reach them after eleven in the morning, or before four in the afternoon. If the pots are half plunged, they will require less attention in watering, but will still be benefited by an occasional syringing to keep the foliage clean and healthy, and must still be kept moderately moist at the root.

REPOTTING.—This is usually performed at the time they are turned out to ripen the seasonal growth. As a rule, Camellias do not like to be disturbed at the root, and when well potted in the first instance, may remain in the same pots for several years in succession if regularly refreshed with top-dressings. Plants that are not doing well should be repotted, in order to excite fresh root action, and the increase in the size of the plants will also render increased root room necessary. As we do not expect to shift them frequently, as we do soft-wooded plants, and as excess of pot-room is an injury, the potting should be performed with care. The Camellia likes a deep, rich soil, and if potted with the abundance of drainage material generally used for *Ericas* and *Epacrises*, will never thrive. Young plants, indeed, soon get poor if their roots ramble among potsherds, which are the delight of most heaths: and the drainage should be made sure, with as few crocks as possible. The chief points to be observed in potting Camellias are, to use the compost very rough and lumpy; to pot them as firm as possible; to give them very small shifts, for unless they quickly fill the pots with roots, the soil will get sour and water-logged, and it will be impossible for the plants to prosper; and never to shift at all unless you are sure they require it. Choose new pots of one size larger than those the plants are to be removed from. Soak them in water a few hours, and meanwhile prepare some clean crocks and nodules of charcoal of the size of hazel nuts. Put over the hole in the pot a good-sized concave piece of tile, or if the pots are large use the smallest sized unglazed flower-pot saucers inverted, as a foundation. Over this strew a few crocks, then a layer of charcoal, and then some lumps of very fibrous peat, or tough turf that has been stacked some time. Turn out the plants without breaking the balls, and examine them well to see if the roots are healthy. Beyond removing the old crocks, you will seldom find it necessary to disturb the root in any way; but if the ball is hard, and become impervious to water, slightly loosen it round the sides with a sharp stick, and remove some of the old soil by lowering the ball into a pail of water, and moving it up and down gently till some of it has fallen out. Having got them into the new pots, ram the compost in all round as hard as you can with a thin wooden rammer, but be careful in doing so not to bruise the roots. By this firm system of potting an immense quantity of soil can be got into the pots for the roots to feed upon, and two or three years may elapse before the plants will want shifting

again. They can never thrive if potted loosely, or if the stuff they are potted in is in a very fine condition. If the new soil does not take water kindly, stand every one, as soon as potted, in a pail of water full enough to run over the brim of the pot; after soaking in this way for an hour, the ball will be moistened quite through, and will afterwards take the water whenever it is given. Twice a year we treat all our potted Camellias to such a soaking as this: first when they are housed for the winter, when, having been kept rather dry to harden the wood, the water does not readily pass through the ball; and again as soon as the buds begin to colour for blooming; and having found the practice beneficial, we recommend its adoption as a regular feature in seasonal management. It is not at all necessary, however, to defer the repotting until the summer growth is completed. If shifted immediately the bloom is over, the warmth given to encourage growth above will also help to fill the pots with new roots, and the strength of the next bloom will be increased. I certainly prefer, as the result of experience, spring to summer shifts; there is a better balance of action induced between the foliage and the root fibres, and the buds get swelled without exhaustion of the wood, which must take place when the whole of the growth has to be completed in the old soil.

SOIL.—The Camellia will grow in good hazelly loam, in peat, and in leaf-mould, with no other ingredient in either case than plenty of silver-sand; but none of these are sufficient of themselves. The best staple material is old turf from a fat loam, well chopped up and stacked for some months to rot. If inclining to clay all the better, and for large plants the lumps ought to be not smaller than walnuts. A mixture of turfy peat and silver-sand, made rather fine, will run in between these lumps, and make a firm material for the roots to work into. Some growers use peat alone, but it is too poor, and needs a little old cow-dung mixed with it. If such fat turf as is advised above cannot be got in the district, I always leave half an inch of spare space on the surface for a mulch of old powdery dung, and when the plants are swelling for bloom, or are put into heat for forcing, I always rake some of this off, and top-dress again with similar powdery stuff of rather a stronger texture, which is pressed firm on the surface. Thoroughly rotten wood is also a good material to mix with turf and peat, as you will find upon turning a plant out some time after that the new roots have run into the wood, before they have fairly taken hold of the turf, and as it is a material retentive of moisture, it suits the Camellia admirably; but if not thoroughly rotten, so as to crumble between the finger and thumb, it will not do. For seedlings and young stocks, good bog mould freshly dug, and broken rough with the turf adhering, is best, but it should be well mixed with silver-sand, and drainage secured by filling the pot one-third full of the most turfy portions. One hollow crock is plenty to use in potting young plants if the lowest layer of soil is of this open and turfy nature. At the next shift, bog should be again the chief of the staple, with a little fat lumpy turf added; and at the next shift, the mixture recommended above for old plants.

CULTIVATION OF THE CINERARIA.

BY J. H.



THIS gay and interesting spring flower is fast becoming a favourite at the principal spring shows, and is to be found in every well-kept greenhouse and conservatory, and it well deserves a place in any collection. The attention of late given to its cultivation has been productive of remarkable results; the well-furnished, regularly grown, and gay plant of to-day is a totally different thing to the meagre, staring plant of the past, and of this great advance we owe much to Mr. Turner, of Slough, who grows them to a considerable extent. I may refer also to Mr. Smith, of Dulwich, who, during the last few years, has made a great stride in richness and purity of colour, although the plants may be delicate in habit. As the leading kinds have been several times successfully exhibited, the work of selection to improve the stock should have immediate attention. A few of the most desirable seedlings are Mrs. Livingstone, Mrs. Dix, Wonderful, Perfection, Purpurea, Editor, Mars, and Sultan. Although the three first-named are all in one way of colour, yet each has its own particular qualities. If they can be got in large 60-size pots, or 48's, so much the better, as they generally throw up stronger for stock than those grown in larger pots. Let me give a few hints on culture, for the information of the inexperienced. Suppose a purchase to have been made in 60's, or 48-size pots, the flower and stem ready to decay, pot on into one size larger, and place them behind a south wall, upon a bed of coal ashes, or upon slabs or slates, as a preventive to worms and slugs; they will soon begin to start into growth if the extremes of damp and dryness be avoided, for an excess in either will speak for itself in the cultivation of the plant. When the grass (as it is called) becomes two or three joints long, it is fit for striking. They should be taken off a little below ground, to secure the fibrous joint which is found below the surface, and placed round the edges of a pot, in a compost of half loam, quarter leaf-mould, quarter decomposed manure, and sufficient sand to take the water through. Pot them into a cold and shady handlight until struck, which, if in a healthy condition, will be in about three weeks. Then harden them off gradually, and pot off into 60-size pots, still keeping in the shade.

THE GARDEN GUIDE FOR JUNE.

THE FLOWER GARDEN.



SHOULD all the annuals not yet be planted, plant at once, choosing showery weather; but should the weather be dry, plant in the evening. Give support to such as need it. The more tender sorts may now be turned out into the borders, and if hot sunny weather follows, they will need a little shading during the middle of the day. Until established, they will require watering once a day, at least, if the weather is dry. Finish transplanting perennials and biennials sown in spring. Tie up the

weak branches on roses, and preserve a neatness in appearance by picking off dead blossoms. Clear the trees of green-fly by frequent syringing, stir the surface of the soil occasionally, and give liquid manure rather liberally. Secure the flower-stems of carnations and picotees from high winds by safely tying them to the blooming stakes, and keep the plants free from dead foliage and insects. Stir the soil about hollyhocks, and give a little liquid manure. Seedling hollyhocks, when hardened off, should be planted above two feet apart. There will now be little risk in planting out to the fullest extent, and all tender annuals, China asters, zinnias, stock, marigolds, petunias, ageratums, lobelias, verbenas, geraniums, etc., may be put at once in their places.

KITCHEN GARDEN.

Peas may be sown for successional crops, but should be soaked in water for six or eight hours previously, to forward them. The principal crop of endive should be sown, and that already up, planted out. Plant out all varieties of lettuce that are fit, give water if necessary, and sow more for succession. Onions intended to stand for keeping should be thinned out to three or four inches, according as they may promise for size. Carrots and parsnips must also be thinned out, if intended for winter store—the former to about six inches, the latter ten inches apart. Plant celery in trenches; if the weather is dry, well soak the trenches before planting. Thin out beet-root to about a foot apart. Radishes may be sown once a fortnight. Prick out cabbages sown last month, and sow a little more for autumn and winter greens. Prick out sufficient savoys for your winter crop, eighteen or twenty inches apart, and should the weather be dry, do not spare the water. Sow stone turnips twice during the month, and hoe out as soon as fit.

FRUIT GARDEN.

Towards the end of the month, peaches and nectarines will require pruning. All foreright shoots should be rubbed off, leaving a good supply of young wood for bearing next year. Thin wall fruit. Look over the apricots; thin them out where in clusters, leaving room for swelling, and towards the end of the month peaches and nectarines will require the same treatment. Peach-houses started in December will now be getting ripe; as soon as they begin to change colour, keep the house dry and give plenty of air, to improve the flavour of the fruit. Stop and lay in all shoots of cherries that require it, before covering the trees with netting. Should the black-fly attack the trees, dip the ends of the branches into tobacco-water. Apples and pears must have proper attention; if too thickly set with fruit, reduce the number. Stop and nail in all shoots of vines that require it. An occasional syringing in the evening will be of great service. Strawberries must have plenty of water, and straw, or clean grass must be laid down to keep the fruit clean.

GREENHOUSE AND CONSERVATORY.

Calceolarias, being so subject to green-fly, must be frequently manured, and if necessary fumigated or syringed. Select a few of the best varieties of cinerarias for seeding; as soon as the seed is ripe sow it in a cold frame or cool part of the house, keeping the soil moist, that they may not perish when germinating. Give the young plants plenty of air, and prick them out when large enough into stove pans. For making stock for next season, the plants may be turned out into the border, where they will throw offsets freely. A good supply of liquid manure may be given to fuchsias; protect them from the midday sun, and those that have not already had their final shift should be immediately attended to. Pelargoniums require great attention this month. Every plant should be examined, that each may be properly supplied with moisture. Do not let them get dry, but they must not be saturated. Manure water may be given as the plants are growing freely. Take cuttings of the scarce and valuable sorts, that you may insure strong healthy stock for next season.

June.

STOVE.

See that the plants are free from dirt or dead foliage; all should now be clean, and of healthy appearance. Strong and vigorous-growing plants may be watered with weak liquid manure rather freely. Carefully look for thrip and red spider, as they increase rapidly, and should be destroyed upon their first appearance. If a single plant only be affected, remove it from the rest, and cleanse it thoroughly before returning it to its old quarters. This will save unnecessary fumigation, give a plentiful supply of moisture. If by syringe, use but little force for fear of injury, but the greenfly must be kept under by some means.

TO CORRESPONDENTS.

SEEDLING RHUBARB.—*C. A. B.*—You should select those plants that do not freely run to seed, as the most useful. Rhubarb that runs to seed as soon as it makes its appearance in spring is worthless. You may sow for several years, and not surpass the varieties already in cultivation. The objects to be obtained by sowing are superiority of flavour, productiveness, and earliness.

CINERARIAS.—*A. B. C.*—The seedlings, though both pretty, are not first-rate.

AZALEAS.—*Beginner.*—You will find little difficulty in the propagation of Azaleas, Rhododendrons, and Oleanders if you proceed as follows. When the plants are full of young shoots about half ripe, slip them off, trim away the lower leaves, and dibble them round the sides of five-inch pots, half filled with peat, and the remainder to within an inch of the pot with pure silver sand. They should be kept close in a frame until rooted, and then potted off singly in peat and afterwards grown in a mixture of peat and loam. Next autumn, the Rhododendrons may be layered by making an incision half through on the under side of the branch selected, and pegging it down firm in the soil, and roots will be emitted from the tongue made by the incision. Azaleas root quickly, if young grass-like shoots are dibbled thickly into silver sand, with sandy peat below it for the roots to work into; they do best in a temperature of 56° to 60°, and must be shaded and covered with bell-glasses till rooted. The Oleander will root quickly if ripe shoots are inserted in phials of water and kept warm, and may then be potted in a mixture of leaf-mould, peat, loam, and a little cow-dung. Rhododendrons seed freely.

BROCOLI AFTER POTATOES.—*Subscriber.*—You ought to manure liberally to take a crop of brocoli after potatoes; and if the ground is liberally manured, it will be in good heart for potatoes again, which always do best where manure was used for a previous crop, and not at the time of planting. Broken bones, soot, green refuse, and anything that will rot, may be turned to account; and do not forget to give the brocoli the benefit of all liquid refuse that can be got from the house. Many people commit to the sewers what is due to the land, and expend money in the purchase of manures, which are not half so valuable as that which costs nothing, and which is wasted without a thought of its value.

LIQUID MANURE FOR ROSES.—*T. Jones.*—House sewage is certainly a good manure for roses, and it is usually sufficiently diluted as obtained. It may be used once a-week from this time until the end of August, after which we think it best not to stimulate them. Use it a little stronger for a fortnight as soon as the first blooms are over. Guano, 10 lbs.; soot, 6 quarts; water, 100 gallons, makes a capital mixture for roses.

ROSES IN POTS.—*K. Z.*—A frame, ten feet by six feet, with three lights, is just the thing to get up and keep a nice stock of pot roses, including teas, because you can give them as much air, sun, shower, shade, and shelter as you like, by means of mats, removal of lights, etc. They must be plunged, and you will find coal ashes or sand, or sifted gravel the best. Make your roses from eyes, as described by Mr. Hibberd in his work, "The Amateur's Rose Book," and you will have better stock than you can buy.



VARIEGATED PELARCONIUMS.

1.—Miss Burdett Coutts.

2.—Peter Grieve.

3.—Howarth Ashton.

4.—Aurora borealis.

VARIEGATED PELARGONIUMS.



THE "tricolor-leaved Geraniums," of which three out of the four varieties figured are examples, are of comparatively recent introduction to our gardens; and they afford the most conclusive and startling evidence obtainable of the power of art to alter the course of nature.

The first decisive step towards the establishment of variegated Pelargoniums was taken in 1848, when Mr. Kinghorn raised from Lee's Variegated Geranium the well-known Flower of the Day. About 1850 the same raiser obtained Attraction and Countess of Warwick, both of them true silver tricolors (though not then so regarded), and forerunners of the now famous Italia Unita.

Ambition was aroused, and many cross-breeders entered the field; amongst these, especial mention must be made of Mr. Halley, raiser of Burning Bush, a small-growing, silvery-leaved variety. In 1853, Mr. Peter Grieve, the most successful cultivator of this branch of horticulture, and the raiser of Mrs. Pollock, began to experiment.

By crossing Flower of the Day with the pollen of Tom Thumb, he raised a fine variegated variety (now discarded), called Culford Beauty. Again he obtained Rainbow, a true silver tricolor. Pursuing his course in this enchanting enterprise, he succeeded in raising, by systematic cross-breeding, the varieties known as Empress of the French, Emperor of the French, and others. In 1855, he began to consider the possibility of obtaining new varieties with golden variegation; and, accordingly, he applied the pollen of the fine old bedding geranium, Golden Chain, to the blossoms of Cottage Maid, and obtained Golden Tom Thumb and Golden Cerise Unique. The next year blooms of the Emperor of the French were fertilized with pollen of Golden Tom Thumb, and one of the results was Gold Pheasant.

In the two following years, that is in 1857-58, the pollen of Gold Pheasant was applied to the blooms of Emperor of the French, and the result was those two most celebrated of all the golden tricolors, Mrs. Pollock and Sunset. Subsequently, Mr. Grieve has raised Lucy Grieve, Mrs. Benyon, Lady Cullum, Victoria Regina, and a host of others equally celebrated.

Here our story must end; those who would know more of the subject will find abundant information in the little "History of Variegated Zonal Pelargoniums," written by Mr. Grieve, and published by Messrs. Blackwood.

We have selected for the plate a group of varieties which may be regarded as representing the highest standard yet obtained in the two classes of gold and silver tricolors, with the addition of one representing the new reticulated-leaved class, the name of which *Aurora borealis*, appropriately typifies its peculiar style of colouring—lurid red, in lines, and suffusing the margin of an otherwise bright green leaf. *Peter Grieve* is a golden tricolor, most perfect in form and tinting, satisfying more nearly than any other the

requirements of the critical florist. *Howarth Ashton* and *Miss Burdett Coutts* are amongst the most beautiful and vigorous-habited of their respective classes.—*Extracted from Mr. Hibberd's "New and Rare Beautiful-Leaved Plants."*

BEDDING PLANTS WITH GOLD AND SILVER LEAVES.



THOUGH the majority of these plants are used as edgings to beds, in order to subdue and tone down and harmonize strong colours, there are many eminently adapted for forming masses, especially where large breadths of neutral tints are required in the centres and connecting points of geometric patterns. The subjects now to be dealt with may be grouped in two distinct classes, namely, plants with "variegated" leaves, which have originated from species with green leaves, and plants which are naturally woolly, silvery, or snowy in appearance, without being "variegated." The distinction is of much importance, and we will cite two cases to illustrate it. The variegated periwinkle is a plant we suppose to be known to everybody. If that is not known to all who read this, then let a variegated-leaved geranium serve for the purpose. If in either of these cases the leaf is examined, it will be seen that its beauty consists in the combination of a mottling, or band, or lines of cream or amber, upon a green ground, or the centre of the leaf is green and the margin white. In any case there is a certain proportion of green in the leaf, which may not be perceptible when the plants are in large masses, because of the superior attractiveness of the white; nevertheless it is there, and the example is one of strict variegation, the result of a sport from a variety wholly green and without variegation at all. Take, on the other hand, a plant of *Cineraria maritima*, otherwise called the "Powdered Beau" and "Dusty Bob;" or if you do not know that, take *Cerastium tomentosum*; or, better known still, take the Rose Campion of the borders. In each of these cases the leaves have none of the ordinary green hue common to vegetation; the *Cineraria maritima* is covered with a grey dust, as if flour had been sprinkled upon it; the leaves of the *Cerastium* are covered with grey hairs, and have a woolly appearance when viewed under a lens, and glisten like silver when placed beside blue lobelia in full bloom; the leaves of the Campion are also woolly; and in all these three cases the silvery appearance is natural to the plant, not the consequence of a sport, and, strictly speaking, they are not variegated. Now, this distinction is of importance as a matter of art and as a matter of culture. In the first consideration, the effect of plants with leaves naturally silvered is generally more decisive. But on that point differences of opinion as well as of fact may arise; for though Lady Plymouth, Dandy, Flower of the Day, and Alma geraniums are strictly variegated plants, and have a certain proportion of green in their composition, nothing can surpass them for beauty when used appropriately in combination with other plants.

Still the radical distinction remains that these have originated out of varieties that were not variegated, whereas the other class are what they are by virtue of their original constitution, and have been silvery, woolly, dusty, etc., etc., from the beginning of the world.

As a matter of culture, the distinction is of immense importance. Plants that are naturally of a silvery or golden hue cannot be altered in their character, though they may be spoiled or killed by bad management; whereas true variegated plants may be changed to their original green colour, and the variegation destroyed by improper management. This is a matter that practical gardeners—though they know all about it—do not always bear in mind as they should, and hence in one garden the same variety of variegated plant will be seen in greater perfection than in another. With plants naturally of a silvery hue, all that is necessary is to provide them with a soil suited to their constitution; with variegated plants the soil should generally be a trifle *poorer* than for the green-leaved types of the variegated varieties. We have proved by experiment that Dandy, one of the loveliest of the minimum variegated geraniums, becomes as green as grass when planted out in a soil heavily manured, and that the same plants, removed into a poor soil, recovered their variegation, and had the same beautiful effect as originally. Look at any border containing a row of the common variegated mint, and it will be a great chance if you do not see amongst the plants many strong shoots wholly green, the plant reverting back to its original condition through being well fed in a rich soil. So with the pretty variegated Arabis; one of the best of plants for a close edging of yellowish-grey, it will every year produce a few green shoots; and if those are not removed, they soon take the whole strength of the roots to themselves, and, overpowering the variegated shoots, in course of time restore the plant to the condition of the common green-leaved Arabis of the borders.

The lesson is obvious, that variegated plants should not be too well fed; and yet it is possible to grow them vigorously without danger. Pure yellow loam with plenty of turf in it is a most nourishing staple for any plant that likes loam, and most variegated plants will thrive in it, and grow to a good size, if specimens are required without a change of character. But a third part of half-rotten dung mixed with the loam would spoil the beauty of at least one half the best variegated plants we possess, and frequent doses of strong manure water would do the same thing without the dung. Peat, sand, and chalk are all favourable to the preservation of the silvery and golden hues of variegated plants; and beds and borders in which they are to be planted should be liberally dressed with those materials in preference to stimulating manures; and if they are not obtainable, sifted sweepings of gravel walks, with pounded bricks and oyster-shells, are equally useful, as they afford a certain amount of nourishment without stimulating. Take *Farfugium grande*, and grow it as you would a cauliflower, and instead of the leaves being boldly mottled and blotched with gold and amber, they will be almost wholly green. Leave the plant alone till it has consumed the gross food given to it, and is beginning to starve, and

once more its leaves acquire their proper beauty ; and if amply supplied with water during the growing season, will acquire their proper size as well as their proper colouring. Mr. Salter, of Hammersmith, who is the greatest collector of plants with variegated foliage, hears frequently from his customers that the plants they have had of him lost their variegation, and are not better than hedge weeds ; but the growers are at fault through giving these choice subjects too much food. If they would pot them in turfy loam and peat, with an admixture of about a fourth part chalk or broken bricks, they would secure vigour without sacrificing character ; but setting a high value on the exquisitely-marked varieties they have obtained, they go a step too far in the use of stimulating manures.

LEAVES NATURALLY OF A SILVERY HUE.

Antennaria margaritacea, a hardy herbaceous everlasting, common in cottage gardens, grows two to three feet high, forming large masses of silvery foliage, and in July produces unattractive yellow blossoms. This is a capital ribbon plant, and if propagated any time from March to May, or taken up and divided in April, may be kept to a close line by nipping out the points of the shoots.

Centaurea candidissima, the whitest-leaved plant we have, requires protection in the greenhouse during winter. Is propagated by offsets, in the same way as daisies and auriculas. It will take some time to get up a stock of this for extensive use ; but it is well worth the waiting for, as there is nothing more striking for a brilliant white line or margin, and single plants are useful for tree stumps, borders, and rockeries ; and it is an attractive pot plant for the conservatory. Some fine plants of this superb species lived through the winter in a bed out of doors, at Mr. Salter's nursery, Hammersmith.

Cineraria maritima.—A beautiful shrub for rockeries ; old plants make fine centres to beds of scarlet or crimson. Cuttings will strike without heat at any season of the year, but are a long time forming roots. It likes a dry chalky soil, and, though quite hardy, should be taken up for the winter, unless the position is dry and sheltered ; damp is death to it. To use this as a bedder, let it flower, save the seed, and sow in February ; it is then admirable for a first or second row, kept to the required height by nipping.

Cerastium tomentosum and *Biebersteinii*.—The first has been extensively used for some years past, and is best known about London as forming the silvery edgings to beds of blue lobelia and scarlet geranium at the Crystal Palace. They are both quite hardy, and thrive in any soil or situation, and if left in the ground over winter, produce beautiful masses of white flowers early in spring time. But for strictly bedding purposes it should be propagated from cuttings at the end of March or early in April, as a vigorous growth is not required. When planted out in May, place the plants four inches apart, and as they grow nip out the points all through the season, which will keep it regular and dense in growth. Of the two, *C. tomentosum* is the best.

Artemisia glacialis and *argentea*.—These silvery-leaved worm-

woods are of excellent habit and quite hardy. They require poor sandy soil and a dry position.

Santolina rosmarinifolium.—A very beautiful glaucous-leaved plant, of easy cultivation, quite hardy, and delighting in chalk and sand. Every student of colour-effects should have it, with a view to its extensive use when occasions arise requiring a silvery plant of a decidedly shrubby character easily kept and propagated.

Stachys lanata.—A hardy woolly-leaved plant, which will be useful to those who want a plant of the habit of *Centaurea candidissima*, but have not the convenience for keeping stock over winter. It spreads laterally in tufts, forming dense masses of grey foliage never more than six inches high, requiring no nipping down. Most easily propagated by division.

Achillea clavennæ is a neat silvery-leaved plant, well adapted for edgings. If its flowers were kept pinched back, it would be very uniform and neat, but the flowers are by no means objectionable, except in highly-coloured and very formal parterres.

A. Egyptiaca produces fine yellow flowers, and is very distinct in its grey leafage.

Festuca glauca.—A most beautiful glaucous-leaved grass, which will grow finely in any rather dry position. It does not make so good an edging as it promises to when seen in separate tufts, but, in some form or other, it ought to be found in every garden.

Sedum glaucum.—This is a close-growing species, which forms a perfectly close surface of neat glaucous growth. It will be invaluable for hot dry soils, where bedding-plants of many kinds do not thrive well. It is also a gem for rockwork.

Variegated mint, which we suppose everybody knows well enough. Nevertheless it is often strangely confounded with variegated balm, variegated arabis, and variegated dead-nettle. The balm and the dead-nettle are of no use for bedding, but make nice clumps on shady rockeries; whereas the mint, which may be identified as easily by its odour as any other way, will grow in any soil or situation, and, when used in masses, is one of the best plants of this class that we possess. There are various ways of turning it to account. As a front row to Purple Nosegay Geranium, or Rubens Geranium, or Trentham Rose Geranium, it is best used alone; but as a front row to *Perilla Naukinensis* it has a superb effect, if intermixed with Lord Raglan Verbena. It scarcely matters how late this mint is propagated, so that it has just formed roots at the time of putting out. When it is required to run up six to nine inches, the plants should be strong, in 60-size pots, from cuttings taken early in spring; but, if required very short and close, April is quite early enough to strike it. We have made bright solid edgings by putting in cuttings in May, while geraniums were hardening in pits, and, when rooted, planting them without any intermediate process of potting. They take hold of the ground in a few days, and, being a free grower, it soon requires nipping down, which makes it dense and bushy. We would make a hundred feet out of half a dozen plants in 48-size pots the first week in May, and have them on the ground in a passable state by the middle of June, by which time the geraniums and

verbenas would be showing good trusses. But the best time generally to propagate it is March, when choice should be made of shoots not entirely white or nearly green, but fully variegated, and with enough green in them to insure vigorous health. Wherever a green shoot appears, it should be cut away to the root, or it will soon war against the variegated shoots by its superior vigour. Once get possession of this useful plant, and it need never be lost, and to keep it true needs only ordinary watchfulness. It is a charming contrast to blue, purple, or scarlet. There is a golden-leaved variety equally beautiful, but of less value for bedding, because the same colour can be so much better obtained from flowers. It is, however, worth having, and is very effective as a ribbon plant. Two plants of the mint and one of blue lobelia, alternating in a row, make a soft bluish-grey, which sets off scarlet to perfection.

Arabis alpina variegata.—Let us call things by their right names, and, as one step towards it, give up the practice of naming this "Alyssum variegata." There is this difference between them: *Arabis* is, in all its forms, an herbaceous trailing plant; *Alyssum* is a miniature shrub. This variegated *arabis* grows in close, dense tufts, spreading laterally, the leaves mottled with yellowish-white, the flowers white, and plentifully produced in April and May. It is hardy wherever the soil is dry, but is apt to perish in winter in damp situations. We always pot up the whole stock in October, and winter them in frames. If a very close line of clear yellowish-grey is required, this is the best plant in existence for the purpose. It may be propagated at any time, either by putting cuttings into sand in seed-pans from May to August, and again with the aid of a little heat in February or March, or may be increased by division every autumn when the plants are taken up, or in April when they are planted. Like the variegated mint, it is a poor man's bedder, and is truly beautiful when well done. In a rich soil, it has the same tendency as the mint to throw up green shoots, which should be removed as soon as they are perceptible.

Alyssum dentatum variegatum.—This is a miniature shrub, with narrow silvery leaves and white flowers, easily propagated from cuttings in spring and autumn, and is very white and attractive as an edging to any brilliantly-coloured bed. It is rather tender, rarely lives through the winter out of doors, does not like damp or a fat soil, is most at home on sand and in an elevated position. Nevertheless, as a bedder, taken up for the winter, and kept in pots well drained and filled with poor soil, it will thrive almost anywhere when planted out. Some years ago, the most dazzling beds ever thought of were to be seen at the Crystal Palace on the Rose Mount. They consisted of Variegated *Alyssum* and Flower of the Day Geranium, mixed; the worst of it is, the mixture is so bright that the eye cannot bear it while the sun shines. It would be still more like fixed lightning by using *Alma Geranium*, the trusses of which are of a more decided scarlet.

Scrophularia nodosa variegata.—This is a novelty of the highest merit. It is quite hardy, grows well in any ordinary good soil; the leaves match those of geraniums for size, and are densely edged with

white. It appears to stand extremes of weather as well as any plant in our garden, and looks almost as well in winter as in summer. For amateurs, whose conveniences and means are limited, this is a most valuable acquisition. In appearance it is like a miniature copy of the variegated Hydrangea.

Thymus vulgaris variegatus, *Thymus serpyllum variegatus*.—The first is a fast-growing and very pretty variegated shrub, which may occasionally be found useful to mix with low-growing plants of strong colours to soften down the glare. It is not showy in a mass, and on the two or three occasions when we have used it as an edging it was not very effective. Yet it is worth having, and we can imagine a bed of some low-growing and gay annuals, such as Venus's Looking-glass, or *Silene armeria*, would be greatly improved by the interspersing of this thyme amongst the plants.

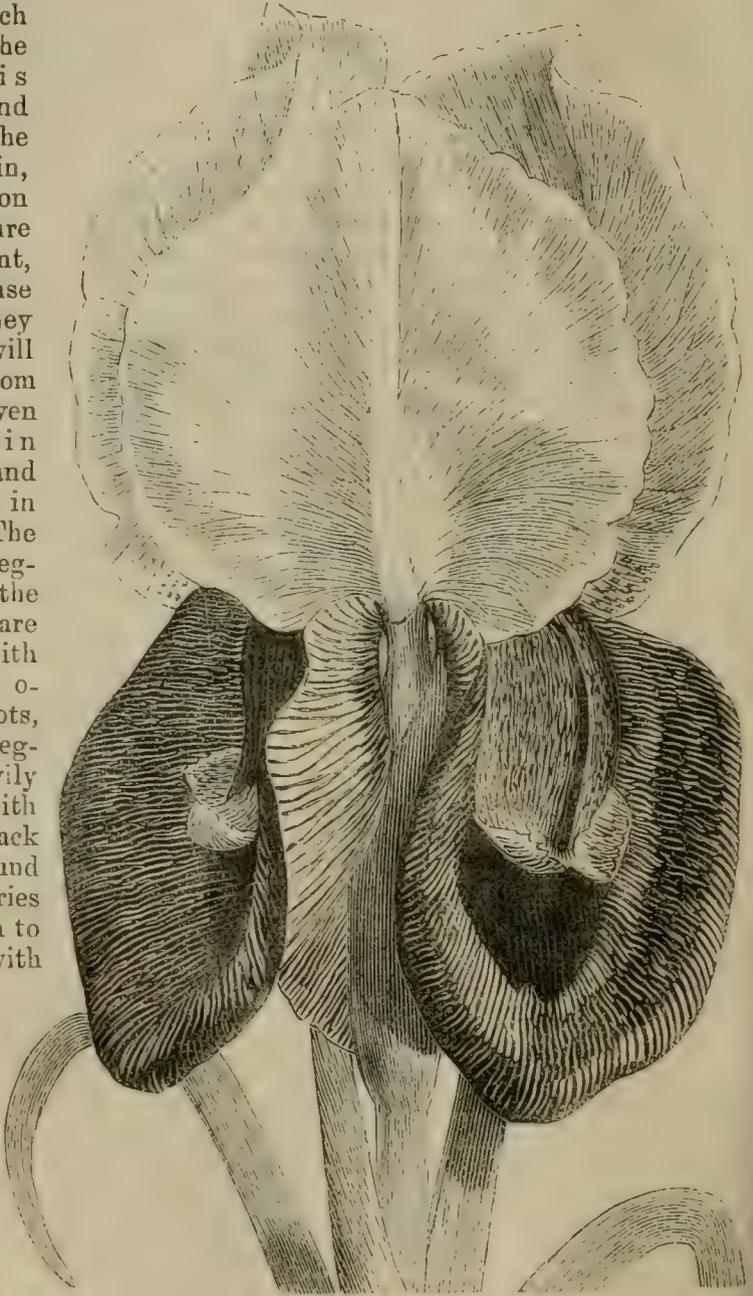
Vinca major elegantissima, *V. major reticulata*, *V. minor argentea*, *V. minor aurea*.—Here are four variegated periwinkles, all exquisitely beautiful and well adapted for amateurs who cannot keep a large stock of variegated geraniums all winter. They grow to perfection in the shade, and no matter what rubbish the soil consists of. All four should be in every garden, to clothe banks and shady borders; and when required for use on a large scale, that which suits best in habit and colour should be propagated by cuttings in spring. The first and last-named are the showiest; there is nothing in the way of variegated plants to surpass them.

Agathe celestis variegata.—This has been puffed into notoriety to such an extent, that people who have not seen it may very well imagine it to be the greatest wonder of the nineteenth century. Now there is nothing wonderful about it, and, so far as variegation is concerned, we have many plants of the same habit and tint that far surpass it in general excellence. We have it planted out now sufficiently near variegated arabis to show that the latter is the brighter of the two, and that the tone of grey is much the same, as there is just enough yellow in the leaf to give to a mass of it the effect of a pale wash of buff colour. We are not condemning it; its merits are many; it grows close and neat, and flowers freely; and as the flowers are blue, that must be thought of in using it as an edging.

Bellis perennis, the variety generally distributed in the trade, called "aucubifolia," is one of the prettiest bedding plants in existence. The leaves are of a rich gold yellow, netted with green veins, and the flowers crimson, double, and plentifully produced. Whoever is in need of something new for a front line, or for filling narrow beds on a terrace, should obtain this pretty daisy, and propagate it from offsets all the summer long, and keep the whole stock in pots through the winter. It is quite hardy, but too delicate a plant to be left to fight the battle with the weather. Those who know it, and would like to use it in quantity at once, can obtain a supply of any of the leading nurseries at six shillings per dozen. For its intrinsic merit it is worth five times that price, and was bought up as fast as it could be propagated, a few years ago, at five shillings each.

IRIS IBERICA.

ALTHOUGH *Iris iberica* is not so showy as some of the more robust growing irids, it is not wanting in attractiveness, and the flowers certainly possess much beauty. The foliage is dwarf and grassy, and the flowers attain, in proportion to the stature of the plant, an immense size, for they oftentimes will measure from six to seven inches in height and four inches in breadth. The upper segments of the flowers are white, with deep blue oculate spots, the lower segments heavily veined with indigo or black upon a ground that varies from brown to buff, and with deep oculate spots of black. There are several varieties in cultivation, differing considerably in colour, and there is certainly no *Iris* save *I. reticulata* that an amateur should be so anxious to possess.



IRIS IBERICA.

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THE PROPAGATION OF ROSES BY BUDDING.



THE stocks for budding upon should be procured at the fall of the leaf, if the earth into which they are to be transplanted be not wet; if it be, their transplantation should be deferred until the spring. A very dry place, however, should not be selected for them, for in that case it will be found that when the budding season arrives, the bark does not remain in a fit state for the operation much longer than a week, and consequently the chances of success are lessened every day after that period. Great attention should be paid in selection of stocks; all starved, bark-bound, diseased, or otherwise unhealthy specimens should either be rejected altogether, or cut down to form dwarf standards. Attention should be also carefully directed towards ascertaining whether the stock has been in any way seriously injured while being taken out of the ground, and if such is the case it must be rejected altogether, for sooner or later disappointment would ensue the very first time they might be subjected to any extraordinary agency—such, for instance, as extremes of heat or cold, of drought or moisture, so soon would they perish. How often have I seen beautiful and valuable trees, not only of roses, but of laburnums and many others, die, defective transplantation being the primary cause, although they had lived in apparent health for ten or twenty or more years.

If the stocks to be budded have been in the situation in which they may be growing for more than one year, it would be advisable either to take them up in the spring and transplant them, or to cut some of the roots off with a spade. Buds always succeed best when inserted on transplanted stocks.

Budding should commence as soon as the flower-buds of the dog-rose in the hedges begin to open their calices. The varieties of the Gallica, Hybrid China, and Provence families should, if possible, be always budded at this season; for in that case they will shoot and make fine heads before the winter sets in, and will bloom well the following spring, neither of which will be the case if they be delayed till the autumn. Budding may, however, be successfully performed until the frost commences, provided that stocks can be found at that time; but, except in particular cases, I should prefer waiting until next spring, as they would be but a week or two forwarder—that is, if they be not killed by the frost, which would be very probable. In the selection of shoots to choose the buds from, those which are very strong should not be chosen, nor those that are very weak. Sometimes there will be a necessity for budding from weak shoots; in that case a larger portion of bark should be taken off with the buds to be inserted, than with a bud from a strong shoot, which latter will require only a portion as small as can be taken. The buds should be inserted as close to the main stem as they possibly can be; they will then be more firm in the stock, will shoot stronger, and will be less liable to meet with accidents than they would be were they inserted higher at a greater distance along

the shoot; indeed, nothing can be more objectionable, more unnatural in its appearance, or more unworkmanlike, than to see buds inserted two or three inches from the main stem. Sometimes it may be wished to insert two buds on a stock which has but one shoot, in order to have "a greater chance of one growing," or to "form a larger head in a shorter space of time." Generally they are then inserted one above another, and, if they both grow, the object of getting a larger head is defeated by the top bud robbing the other of all its nourishment. If the top one only should happen to grow, the scar where the other was inserted often produces a disease; or, if the bottom one only should grow, then good-bye to the larger head. It is preferable to insert them side by side, and tolerably close to each other. If the buds be short, and inserted closely and firmly to the main stem, the ligature need not be carried round the shoot more than twice, and thus a great saving of time is effected.

I have no fault to find with bass matting for the tying in of the bud, excepting from its liability to break while being used. To avoid this, I prefer using coarse worsted, such as is used for oil lamps, by using which the tying is performed more expeditiously. After the buds are inserted, the shoots on which they are placed should be cut in about one-third of their length; if the bark "runned hard" (in which case it would be hardly worth while to bud at all), one-half. After the inserted bud has begun to swell, the shoot should be cut to within an eye or two of the place of insertion; this will give the bud encouragement to form a good head before the winter. If the bud be inserted late in the autumn, the shoot should not be cut back. If buds be procured, and it is not found possible to bud them that day, they should not be put into water to be preserved, but in a tin box (a botanical box ought to be an essential in every tool-house). They will then keep for a fortnight or more, and if they be put into water for a few hours before they are wanted, say three hours, they will succeed as well as though they were inserted immediately they were cut off. I do believe that the failures in budding are as often attributable to the long immersion of the buds in water as to all other unfavourable circumstances united. In sending buds on a long journey, they should be sent in a tin box without any moss or other *et cetera* around them; if I had not that convenience, I would prefer packing them in dry moss. I recollect once receiving a parcel of rose-shoots for budding from Paris. They were evidently first moistened or sprinkled with water, and afterwards folded in what I guessed to be seakale leaves, and then the whole was wrapped in a piece of canvas. It was placed under the protection of a gentleman just then leaving France for England, but who by some circumstance was afterwards detained some days longer than he expected. The roses at length arrived with him, having been between a week and a fortnight on their journey, and on being opened the whole was found to be a mass of rotteness; the very names on the parchment were illegible. About a dozen buds grew, with a loss, probably, of hundreds. If these shoots had been packed in dry moss, they might have remained

longer than they were on their journey, and yet have arrived safe. In the above remarks I hope it will be understood that I disclaim all intention of passing anything off as new or peculiarly my own; indeed, the knowledge of the universality of the practices there recommended caused me for some time to doubt the propriety of sending them for publication; and it was only the recollection of the fact that there was no operation in the art of gardening so perfect as not to admit (to use an expression of the Editor's, in a late number) of "line upon line" being written, that it is impossible for a writer to prevent a reader from including under the same word more ideas than he himself intended, and that in the most unimportant fact a logical or grammatical error, or misconstruction of a sentence, may often be the means of causing the most important ideas to arise in the minds of others, and thus indirectly bringing to light new facts which directly might have long remained hidden.

WINDOW GARDENING.

BY JOHN R. MOLLISON.

(Continued from page 173.)

BULBOUS-ROOTED AND ROCK PLANTS.



AS I said in a former paper, a small rockery under your window in connection with your window-box could be so arranged that rockery, window-box, and creepers would appear to form one harmonious whole. Such a window in the height of the season would have a beautiful effect, and be the admiration of every passer-by. Clinkers from a furnace make a nice rockery. A few white pebbles and shells heighten the effect. Raise a mound of soil and build your materials over it as naturally as you can, leaving crevices in which to plant your roots and flowers. I will select a few of the most suitable plants for a rockery.

Aubrietia.—A lovely little rock plant of many varieties, with green and variegated foliage. Grows in a dense tuft or mass.

Cerastium tomentosum.—A silvery foliaged mouse-ear chickweed; flowers white.

Arabis.—A hardy class of spring flowering plants suitable for rock-work, of various kinds, green and variegated; flowers white.

Echeveria.—This is an excellent class of plants for rock-work. *E. pumila*, *E. glauca*, *E. secunda*, *E. secunda glauca*, and *E. secunda metallica* are the best for our purpose.

Armeria, or thrift, the well-known sea daisy; very pretty rock plant; flowers red and white, double.

Sempervivum.—Similar to the above. *S. Californicum*, *S. arachnoideum*, and *S. montanum* are the most suitable. No rockery is complete without *Echeverias* and *Sempervivums*.

July.

Glechoma, or Ground Ivy.—A pretty trailing rock plant with delicate pink flowers. The golden and silvery variegated varieties are very pretty for a rockery.

Sedum.—An indispensable class of plants for rock-work. *S. acre*, *S. acre aureum*, *S. Hispanicum*, and *S. glaucum* are the best. They are easy to grow and cheap, and look lovely on a rockery.

Heartsease and Violas.—Well-known flowers for the open border, and do very well for rockeries where there is room.



ECHEVERIA SECUNDA GLAUCA.

Hepatica.—A lovely spring-flowering class of plants; looks pretty in a rockery. Small ivy-like foliage; flowers white, red, and blue, double and single.

Antennaria tomentosa.—A perfect little gem; no higher than moss on a stone or tree, and nearly like snow for whiteness.

Stellaria graminea aurea.—A beautiful golden chickweed, suitable for rock-work, its yellow foliage forming a good contrast to other plants.

Vinca, or Periwinkle.—The minor gold and silver variegated varieties are excellent rock plants; flowers blue and white.

Saxifraga.—A splendid class of plants for rock-work. The common *London Pride* is well known. One of the best is *S. longifolia vera*.

Ivy-leaved geraniums, lobelias, dwarf nasturtiums, and several other plants do well in a rockery, provided they do not crowd the others. Ferns are excellent rock plants. I will note those suitable



SEMPERVIVUM ARACHNOIDES.

for the purpose in the papers treating on ferns, and will select a few of the most suitable bulbous-rooted plants for window gardening before I close this article.

Hyacinths are particularly adapted for cultivation in pots, glasses, and jardinetts. The proper soil for them is composed of two parts turfy loam well decayed, one part dry cow-dung well rubbed down, one part leaf-mould, and one part silver sand. This soil suits tulips also, and snowdrops, crocuses, etc., with a little less manure. When

July.

potting your bulbs give good drainage, and place the bulbs on the surface, pressing them down into the soil till nearly covered. Crocuses and snowdrops should be about an inch under the surface. Hyacinths in glasses require rain water, and the glass should be filled till just touching the bottom of the bulb. Renew the water now and then as it gets impure, and keep adding more as the roots drink it up. October is the best time to fill your glasses and pots. Keep them in a cool dark place—a closet would do—till they have



SEDUM SPECTABILE.

grown an inch or so. After this bring them out to the light, and let them have as much fresh air as possible. Keep them from frost, but as cool as you can above it. Frost destroys the bloom. The double varieties are not so good for pots or glasses as the single. Among the best are the following:—

Red.—*d.* Bouquet Royal, *s.* Amy, *s.* Baron Rothschild, *s.* Prima Donna, *d.* Princess Royal, *s.* Von Schiller.

Blue.—*s.* Grand Vedette, *d.* Rembrandt, *s.* Celestina, *s.* Grand Lilas, *d.* Prince of Saxe-Weimar, *s.* Shakespeare, *s.* General Lauriston.

Lilac and Mauve.—*s.* Adelina Patti, *s.* Haydn, *s.* L'Unique.

White.—*s.* Grand Vedette, *s.* Blanchard, *d.* La Virginité, *s.* La Vestale, *d.* Prince of Waterloo, *s.* Queen Victoria, *s.* Seraphine.

Yellow.—*d.* Heroine, *s.* Overwimoar, *s.* King of Holland.

s. stands for single; *d.* for double flowers.

You can purchase much cheaper Hyacinths for your window box than those I have enumerated; the same of the Tulips.

Tulips are magnificent spring-flowering bulbs very suitable for pots and window boxes. The following are the best for the purpose. Plant at the same time as you plant your Hyacinths; the double Tulips are best. Equal parts of turfy mould, leaf-mould, and sand form the proper soil. Double Duc Van Thol and single Duc Van Thol, *s.* Ardennus, *s.* Queen Victoria, *s.* Duchess de Parma, *s.* Pax Alba, *d.* La Candeur, *d.* Duke of York, *d.* Rex Rubrorum, *d.* Purple Crown, *d.* Yellow Rose, *d.* Tournesol, *d.* Tournesol Yellow.

Crocus.—This and the Snowdrop are the first heralds of spring. Nothing is so suitable for window gardening as the lovely Crocus. In boxes and pots they should be planted pretty close. The best are the following, in different shades of white, blue, yellow, and purple; soil same as for Tulips:—Albion, Charles Dickens, Florence Nightingale, Prince Albert, Mont Blanc, Sir Walter Scott, Liliacinus superba, Othello, Barr's new Golden Yellow, Yellow Dutch, Yellow Scotch.

Snowdrop, the Harbinger of Spring.—Beautiful in pots and boxes. Treat them the same as the crocus. There are both single and double bulbs.

Muscaria, or the Grape Hyacinth, are charming subjects for pots or boxes to mix with Hyacinths and Tulips. The same treatment as for Crocus or Snowdrops. The best are *M. botryoides cæruleum*, *album*, and *pallidum*, *M. racemosum* and *M. racepalleus*.

Amaryllis.—Here we have a magnificent class of plants for pot culture. Pot them in six or seven inch pots with good drainage, in equal parts of loam, leaf-mould, and silver sand, with one half part peat. The secret of flowering them is to leave them undisturbed in the same pot for years, giving them little water when at rest, and plenty of water when actively growing. The best for pots in windows are the following:—

A. atamasca, the Atamascan Lily.

A. candida, "the flower of the west wind."

A. lutea, "the lily of the field," supposed to be the lily of Scripture.

A. vallota purpurea, the Scarboro' lily. This last-named is the best for windows, and is of the highest order of merit. Its large scarlet blossoms are unequalled for beauty and effectiveness.

Lilium.—This is the queen of window plants, and easily cultivated. Nothing can surpass well-bloomed plants of the following varieties:—

L. speciosum album, *L. speciosum rubrum*, *L. speciosum roseum*.

But by far the grandest of all the Lily tribe, and well meriting the name of "Queen of the Lilies," is *Lilium auratum*, the flowers when expanded being six or eight inches across, sometimes nearly a foot; colour creamy white, with gold bands and reddish spots. The best soil for them is the same as for *Amaryllis*.

Convallaria majalis, or Lily of the Valley, is a splendid pot sub-

ject or to mix with other bulbs in the window box. Plant four or five tubers together in a clump, and three of the clumps in a pot. They are favourites with every one.

Cyclamen, a charming tuberous-rooted plant for winter and spring blooming, of easy cultivation, having pretty variegated foliage. The best soil for them is composed of equal parts of loam, leaf-mould, and silver sand. The best for pots are *Cyclamen Persicum*. Plant the tubers in the pots fully half below the surface, and never let them get dry. Water them overhead.

Ranunculus.—Very pretty root for window boxes. Plant in your window box in January, an inch under the surface.

Anemone.—A companion to the *Ranunculus*. They are both exceedingly cheap, and very lovely when in flower.

There are many other bulbous and tuberous rooted plants suitable for window gardening, too numerous to mention here, however. The above list contains the general favourites, and can be procured from any nurseryman. Bulbous-rooted plants all require plenty of water while growing, and are all lovely to behold in a window, and repay you tenfold for your trouble when they spread their charming flowers and fill your room with their delicate fragrance. One of the great causes of their being such general favourites is that they are in their glory when there is very little else in flower.

(To be continued.)

ON THE CULTURE OF PINKS FROM PIPINGS.



THE term pipings is given by the florists to the side-shoots of Pinks, Picotees, Carnations, etc., when taken off for the purpose of rooting, and increasing the number of plants. It is not an uncommon practice with the uninitiated to tear out the side-shoots from the main stem, regardless of the injury they incur for the old plant, which more frequently dies than not; but it is not always that such a mode of treatment is of consequence, as the old plant may not be required any longer, having produced a sufficient supply. Notwithstanding, it is far better, in a general way, to cut them off, and leave a few joints to break again, for should there be a failure with the first course of pipings, you will find a fine stock plant ready to furnish you with a second supply of cuttings, which will be in time for rooting and planting out; if not, the old plant may prove the means of securing the particular variety. It therefore appears plain enough that the latter system of propagating is the most economical and important, more particularly so when you have valuable collections under your care.

THE PIPING BED.—Pinks strike roots as freely under a north wall as they do on the south side of the garden, and much of the trouble in shading is saved. When in the former position, one of

the principal points to be observed is the proper preparation of the piping bed. Prepare a sufficient quantity of spit dung to form a layer of eight to twelve inches deep; should it be inclined to dryness, let it be well wetted. When in proper condition, beat it firmly together to the depth given above, and bring it to an even surface.

Upon this the soil for the pipings to root in is to be placed. Equal portions of leaf-mould and sand are excellent for the purpose. It should be sifted rather fine; but if such soil is not at hand, supply some sweet sandy soil in its place, giving preference to leaf-mould or decayed vegetable mould, if it can be conveniently procured. A layer of three inches, pressed rather firm, will be quite sufficient; let it be watered, that it may lie close. The cuttings are prepared as follows:—Having cut them from the plants, strip off the lower leaves to about the third joint from the top of the cuttings; then with a sharp knife cut off the lower part close under the knot or joint selected, and when a sufficient number is prepared to fill a glass, throw them into water for a few minutes to stiffen, and when ready, press them into the soil prepared, to the depth of three-quarters of an inch. Give a slight sprinkle of water to settle the soil round the stems, and when dry cover them with the glass; let the latter be quite clean before using. They are not long taking root, generally about three weeks, varying a little with some sorts.

It is an old custom, when preparing the pipings, to cut off the top of the foliage; this is an unnecessary mutilation, for the plants thrive better when the tops are left on. Very little experience will prove this.

PROPERTIES AND CULTURE OF THE PETUNIA.



FOR a long time after its first introduction the petunia was looked upon as almost worthless; indeed, it has been compared to a "*mean weed*"—a comparison not much to be wondered at, looking back some years at the flimsy appearance of the flower and the wretched foliage of the best varieties that were produced. At the present time there are to be found amongst novelties, where florists' properties are a secondary consideration, as many beautiful petunias as of any other class of decorative plants, their tints and markings being exquisite. But the want of substance and general deficiencies of form make them unsightly to the florist eye; but skill and cultivation must and will get over such difficulties. Indeed, when we look back to the old Magnifica, and at the present Phaeton, or to the old Snowflake, and the present Fascination, what a contrast—the former ones starry, and apparently half-dead, laying and lapping over and about for want of substance; the latter standing erect, with a convolvulus-like appearance, forming a perfect and symmetrical trumpet-like cup. Let us, then, abandon the word "*weedy*," and look to florists'

points. The geranium has become a florists' flower. Why not the petunia? It is not less beautiful in its varied and vivid colours, and much longer continuance of bloom. To constitute a good petunia the characters should be as follows:—The flower should be as near a circular form as possible, merely showing five slight indentations on the outer edge, and which should lap over each other, making up the circumference, also indicating the size of petal. Secondly, the centre line or rib in each petal, which commences at the base of the tube at each division of the calyx, should be of sufficient substance to hold each petal in its proper form, also tapering from the base of the tube to a point at the petal edge; otherwise, if not of sufficient strength, and too much indentation between each petal, the flower will have a flimsy appearance, as is the case with by far the greater number. On the other hand, too heavy a line is often observed, and this is nothing less than coarseness. Thirdly,



the very beautiful pencilling and marking in the tube, the greater portion of which are on the upper part, should end abruptly, so to speak, that is, not to intrude on the surface of the flower, whether selfs, or flowers with white sulphur, dark violet, or purple tubes; otherwise than this is coarseness. Fourthly and lastly, the habit should be dwarf and free, what might be called a soft grower; if, on the contrary, hard wooded, they are very difficult to keep through the winter and to propagate. I am quite certain it is capable of being brought to a dwarf, shrubby, and compact habit, having myself, at the present season, seedlings of from six to eight inches high literally covered with bloom. These being cross-bred, I shall term Hybrid Dwarf Bedders—a style of growth so much wanted for bedding purposes as well as for pot culture, being alike desirable either for the conservatory or for beds and borders.

Free flowering scarcely need be added. I rarely ever saw one

that was not free, if in a healthy growth at all, though I have bred them for several years, my attention being first directed to them in 1846, and I have been a breeder of petunias more or less ever since, according to conveniences. Indeed, so confident have I been of the strain of flowers I should have, from my own hybridizing, that in 1857 I ventured to plant a bed in a conspicuous position wholly of seedlings. Although they differed in shape of bloom, they were all *purples*. And were I but a cottager, and nothing but my window for the raising of seeds, I should have a batch of seedling petunias; for the scent, though peculiar in many, is very sweet in others, and for bloom there is a succession from June until frost puts an end to it. But for those who have not convenience or practice in breeding



named varieties of course are best; and as the newest flowers are easily to be obtained, and are moderate in price, and are easily propagated, there is no excuse for not having a sufficient supply of the very best. But then it is said by some there is not a sufficient mass of bloom, at one time, to make it a bedding favourite. Is this the fault of the plant? I unhesitatingly answer, No. What, then, is it?—what makes them in a wet season run so much to growth, or in a dry season die off by exhaustion?

Take a set of plants, and plant them in a light compost, say, for instance, in a border that has been enriched with decayed manure or a quantity of leaf-mould, supply plenty of water, and if the plants are trained perpendicularly, they will soon be the same height as yourself. Again, if dry weather, the foliage will become small and

scant. A deficiency of flowers, then, must be the result in both cases. What, then, will such experience teach us? Why, that the majority of the failures are owing to light soils. If they are planted in a good-holding *loam*, in wet seasons they cannot work too fast with their minute fibres; thus causing a sturdy growth, and, after three or four fine days, a mass of bloom. If, on the contrary, a dry season, the holding quality of the loam supplies their small fibres with sufficient nourishment, so as to cause plenty of growth, also an abundance of bloom.

Such, then, are the results of practical observation and the experience of several years. For pot-culture, compost of three-fourths good holding loam, and one-fourth of leaf-mould, with a good sprinkling of silver-sand, and *cool* treatment, they grow fine, and are sure to repay for extra care and labour to the ardent admirer of nature and its flowers.

THE HOLLYHOCK.



AN we dispense with the hollyhock? The rose is a more general favourite, and in its varied states of standard, climber, and bush, a more available plant; the dahlia is still the "queen of autumn;" but for the old nooks and corners in small gardens, and for planting in masses for distant effect in large gardens, there is no flower so suitable as the hollyhock. As to the height to which it grows, this cannot be fairly urged to its disadvantage; there are positions in almost every garden for which this feature renders it peculiarly adaptable. The best of our "bedding plants" are of lowly growth; we must look down upon them to appreciate their beauty. But we cannot always be looking down, be the prospect ever so charming. And there is a new feature of beauty in that garden where, on raising the bent head and downcast eye, we meet with spikes of hollyhocks breaking the flatness of the general surface by streaks or lines of rich and varied colours rising high among the leafy trees. In many beautiful gardens that we have visited, we have been more than disconcerted by the abrupt transition from "bedding plants" to trees, moderated as this has sometimes been by raised baskets and pillars of summer climbers. Beautiful as are these latter, they are not sufficiently massive. The hollyhock, and, as far, as we know, the hollyhock alone, effectively fills the vacuity. We know that it has been the fashion with some to decry this plant, calling it coarse, formal, and weedy. Admitting that there is some truth in this, may we be permitted to ask, is it not also bold, striking, and effective, and are not these elements worth combining, at some sacrifice, with the rich, the bright, the beautiful?

Thus far of its value in garden scenery. But it has lately come to be considered as a florists' flower. The busy brain and hand of the cultivator have been engaged in its improvement; and those

who remember the hollyhock of twenty years ago cannot fail to mark how complete has been the success. Not only has it become even more useful and effective for garden decoration, but it has received a degree of elegance and symmetry from the hands of the cultivator that has fitted it to take a position in company with the most distinguished of Flora's subjects.

The hollyhock flowers naturally in August, but by a little management the bloom may be prolonged, and continue from July to November. Old plants that have bloomed the year before will bloom the second year in July and August. Cuttings taken and rooted, or seed sown out of doors the previous summer, will bloom in August and September. Seed sown in pans as soon as ripe, and wintered under glass, will bloom in October of the following year. By using these three sorts of plants, a succession of flowers may be kept up. If an early bloom only is required, old plants must be planted; if a late bloom, young plants and seedlings.

In planting for effect, we would always recommend planting three or more of the same sort close together in a group, choosing the clearest and most distinct colours, and those which produce the densest and broadest spikes. When growing for exhibition, the form of the flower is of course the primary point for consideration, and here it is usual to plant in lines three or four feet apart, that the culture of the plants may be more carefully and more conveniently attended to. There are some sorts which are alike suitable for exhibition and garden decoration, but both objects can scarcely be attained conjointly. But as to culture, the hollyhock is not particular in regard to soil, it will grow and flourish almost everywhere. The finest spikes we have yet seen were grown on a strong moist loam that had been deep trenched, richly manured, watered in dry weather, and well cultivated by frequent and deep hoeing.

Cuttings of hollyhock, single eyes, taken in July and August, and placed round pots in a cold frame, will root in a month, and may be placed in single pots and stored in a cold frame through the winter, repotting into larger pots in February, and planting out in April. Seed should be saved from the best formed, the smoothest, and most double varieties only, and to insure a fair crop of seed it is necessary to pull the flowers from their stalks, so soon as the former begin to decay.

There are two seasons at which the seed may be sown—first, in July, in the open ground, the seedlings to be transplanted or not, according to the convenience of the cultivator; and, secondly, in October, in pans, to be potted into single pots in November, and kept under glass till planted out in April. If the seedlings sown in the open ground are to be transplanted before flowering, October is the best time, and next to that April.

In planting out, whether from the ground or pots, a showery day should be chosen, and after planting the stems should be surrounded with a little stable manure. If the weather or soil be dry, water copiously till the flowering declines. The hollyhock, with its large surface of leaves and great perspiratory powers, consumes a great quantity of water, especially at that period of its growth, in

June and July, when the leaves so rapidly increase in size. So soon as the spikes rise from the crown of the plants, stakes should be driven in at least two feet deep, and allowed to remain the same height above the ground, which is sufficient to hold any spike, and will not interfere with the flowers. One, two, or three spikes may be left to each plant, remembering, however, that the fewer the spikes the larger will be both spikes and flowers. Sometimes the flowers are so thick on the spike as to interfere with the expansion of the guard petals. In such cases thin out the flower buds when about the size of a nut. Tie up with strong bast from time to time as the spikes rise. Top the spikes at any given height; in sheltered situations they may be allowed to rise to nine feet; but where much exposed to wind, seven feet should be the maximum. Shading is necessary, if growing for exhibition, especially with the delicate coloured varieties, which quickly soil if exposed to sun, wind, and rain. Fortunately this soiling is not sufficiently great to interfere with the effect of the spike in the garden, and as shading is troublesome and unsightly, it may well be dispensed with except where growing for exhibition.

Some few years ago the hollyhock suffered great depreciation from being attacked by a disease which baffled the skill of our best cultivators. Thousands of plants, both young, unbloomed seedlings, and named sorts, suddenly decayed, often just as the first flowers were expanding, when it was impossible to refill their places. This, we believe, was attributable to the unwholesome plan, too generally adopted, of forcing the plant, causing it to grow out of season, and in a close unnatural atmosphere, in order to obtain a more rapid and extensive increase by root-grafting. If we have rightly studied the vegetable kingdom, there are few plants that will bear this strain put upon them without suffering a diminution of vital power, not always quickly recovered, but often conveyed downwards to the offspring, alike through cuttings and seeds. Certain it is, that by the discontinuance of this practice the disease gradually disappeared, as far as we know, and is now almost extinct. W. P.

JULY WORK IN THE ROSE GARDEN.



BEFORE any of the early blooms are past go over the whole stock, catalogue in hand, and see if the tallies are right, and determine the characters of new varieties as better or worse than old ones in the same class of form and colour. Budding on briars out of doors is the great business of the month. During dull, rainy, close weather neglect everything else to get as many buds in as possible. The manner in which the several varieties bloom will afford better lessons on culture, and especially on pruning, than all the books that ever were written. Gather all the fading flowers daily, place the petals in open baskets in a shady place to dry, and let the ladies

have them for their perfume jars. If you desire seed of any variety, allow a few of the first blooms to expand, remove all the rest, give the tree no water, and leave the rest to nature and to fate. If you impregnate with selected pollen, tie the impregnated flower in a light muslin bag. To induce any particular variety to seed, keep it on poor diet and give it very little water, the blooms will then come comparatively single, and will furnish or receive pollen, as may be desired. If the flower intended to receive the pollen is not open at the same time as the father flower, the pollen may be taken off with a dry camel's-hair pencil, and be preserved between silver paper till required.

In the rose-house give air night and day, deluge the place with water, train in all this season's growth; do not shade, except for special reasons, as when yellow roses are just opening, then a little shade is good. Assist the Teas with some good fertilizer on the surface to help them in the autumn bloom. There is nothing so good as half rotten dung, but as it is unsightly, a mixture of guano and wood ashes is to be preferred, and it should be carefully pricked in.

USES OF THE ROSE.



ROSE WATER is distilled from the petals of pale roses, in preference to deep red ones, mixed with a small quantity of water; and in France those of the musk rose is preferred when they can be obtained. This product of the rose was known to the Greeks in the time of Homer, and to Avicenna among the Arabs, A.D. 980. It is more or less in use, in every civilized country, for the toilet, and on occasions of festivals and religious ceremonies. *Vinegar of Roses* is made by simply infusing dried rose petals in the best distilled vinegar. It is used on the continent for curing headaches produced by the vapours of charcoal, or the heat of the sun. For this purpose, cloths or linen rags, moistened with the vinegar, are applied to the head, and left there till they are dried by evaporation.

Spirit of Roses is produced by distilling rose petals with a small quantity of spirits of wine. This produces a very fragrant spirit, which, when mixed with sugar, makes the liqueur known in France by the name of *l'huile de rose*: it also forms the ground-work of the liqueur called *parfait amour*.

Conserve of Roses is prepared by bruising in a mortar the petals with their weight in sugar, till the whole forms a homogeneous mass. In the earlier ages, according to Rosembourg, in his "History of the Rose" (published in 1631), the rose was a specific against every disease. It was much in use in the time of Gerard, and is still employed in the composition of electuaries and many other medicines.

Attar of Roses.—Essence, attar, otto, or, as it is sometimes called, butter of Roses, is the most celebrated of all the different preparations from this flower, and forms an object of commerce on the coast of

Barbary, in Syria, in Persia, in India, and in various parts of the east. In England it is usually called otto of roses, a corruption of the word "attar," which, in Arabic, signifies perfume. This essence has the consistence of butter, and only becomes liquid in the warmest weather: it is preserved in small flasks, and is so powerful, that touching it with the point of a pin will bring away enough to scent a pocket-handkerchief for two or three days. The essence is still procured almost in the same manner by which it was first discovered by the mother-in-law of the great Mogul, in the year 1612, viz., by collecting the drops of oil, which float on the surface of vessels filled with rose water, when exposed to a strong heat, and then congealing it by cold. *Honey of Roses* is made by beating up fresh rose leaves with a small quantity of boiling water; and after filtering the mass, boiling the pure liquid with honey. This was formerly much in use for ulcers in the mouth, and for sore throats. *Oil of Roses* is obtained by bruising fresh rose petals, mixing with them four times their weight of olive oil, and leaving them in a sand heat for two days. If the red Rose de Provins be used, the oil is said to imbibe no odour; but if the petals of pale roses be employed, it becomes perfumed. The oil is chiefly used for the hair, and is generally sold in perfumer's shops, both in France and England, under the name of *L'huile antique de rose*.

THE CULTURE OF THE GENUS KALOSANTHES.



SOME of the species of this genus are amongst the most showy and fragrant of summer-flowering plants, and they deserve to be more generally cultivated than they have hitherto been. The magnificent specimens annually produced at the great Metropolitan exhibitions in July indicate the capabilities of the genus; and good plants are frequently produced far from the scene of these meetings. I doubt, however, whether any genus equally deserving attention is so commonly neglected or mismanaged as this. With a little care the flowers remain in perfection for some six or eight weeks, and the plants will be found exceedingly useful in the show-house, to take the place of the azalea, when the beauty of the latter is over. Young plants intended for specimens should be dwarf and bushy, with strong, well-ripened wood; those that may have been wintered in a soft, half-growing state, should be rejected, as it is difficult to get them to break freely, or grow vigorously. Place them early in March in a mild growing temperature of about 45° at night to 60° with sunshine. The shoots must be stopped, or cut back, as may be necessary to insure a compact bushy growth, and young branches will be produced much more freely, if two or three pairs of leaves are removed from the points of the shoots; and this should always accompany stopping.

If the roots are abundant and active, shift into pots two sizes larger than those the plants are in; but first see that the soil is

properly moist, and be careful to have the mould to be used in the same condition.

Nothing is more likely to cause failure than neglect of this. The side-shoots should be tied out, keeping them near the surface of the soil. Keep the atmosphere rather close and moist, and water carefully, till the roots start into the fresh soil. When the plants are broken and fairly started, the temperature may be increased to about 55° degrees at night, and from 65° to 70° with sunshine. This high temperature must not, however, be maintained without a free circulation of air; for the *Kolosanthes*, like most Cape plants, very much dislikes a stagnant atmosphere, and it requires all the light which can possibly be afforded it, therefore admit air freely, and keep the plants near the glass.

In May, or as early as warm weather sets in, they may be removed to a cold frame, where with a little care they can be kept sufficiently warm, and where the conditions most conducive to vigorous growth will be readily supplied.

Air should be freely admitted whenever the state of the external temperature will permit; although a stagnant, humid atmosphere is injurious, with a circulation of air it cannot be kept too moist; if they stand on a bed of coal ashes, this should be watered on the mornings of bright days, and the plants sprinkled over-head towards evening, leaving a little air on during the night, and a thin shade should be thrown over the glass during the forenoons of bright days, but use this sparingly. A liberal supply of water will be necessary whilst the plants are in active growth, but to give no more than is requisite to keep the soil in a healthy, moist state, and when the pots are moderately well-filled with roots, manure water in a clear weak state may be used with advantage two or three times a week.

The treatment of the plants after midsummer must be regulated by the size of specimens desired. To produce large flowering plants it will be necessary to grow them two seasons, and in this case they should be stopped and potted as early in June as they may have filled their pots with roots. Have an eye to the formation of compact dwarf specimens, and stop and cut back as freely as may be necessary to secure this, for they break freely, and there is no danger of injuring them by stopping or cutting back. If plants to produce about a dozen heads of bloom each are all that is wanted, with good management this may be secured by one season's growth; but if large specimens are desired, it will be necessary to grow them two seasons. Plants intended to flower the following spring should receive a rather large shift at the beginning of the season, and must neither be stopped nor potted after the middle of May. It may be advisable to inform beginners at once that it is easier to produce large handsome specimens of *Kalosanthes* than to have well-flowered plants; and unless the wood is thoroughly ripened previous to winter, it will be useless to expect a fine display of blossom.

The necessary maturation of the wood can be effected only by subjecting the plants to full exposure to air and sunshine, and keeping the soil in a rather dry state. This change of treatment must

be introduced very gradually; but if a fair amount of flower is expected, the plants should be inured to it by the middle or, at the latest, end of August. Those that were repotted may be treated less hard during autumn, but care must be used to get the wood of these well ripened before winter. If they can be placed near the glass in a house where grapes are preserved during winter, they will be suited perfectly; and as they require very little water at the root, they will be less injurious there than most plants. The best situation for the flowering plants during spring is the front shelf in the greenhouse. They should be kept freely exposed to air and sun; and after the appearance of the flowers the atmosphere can hardly be kept too dry. A moist stimulating atmosphere promotes growth, and the effect of this would be an unsightly lengthening of the stems, an occurrence by far too common. When the flowers assume their proper colours, remove them where they can be kept dry, cool, and shaded from the sun.

Plants intended for large specimens should be stopped and potted in March, and treated as already recommended for specimens intended to flower the following spring. I prefer keeping up a supply of young plants, and with the exception of any plant that may be full of young wood near the base, I throw all to the rubbish heap immediately after they have done flowering.

Propagation is easily effected. I generally select firm young shoots with several branches, and plant them in four-inch pots in sandy peat, placing them in a close pit, and carefully shading them till rooted, which will be in about a month. As regards soil, this should be light, but rich; half turfy sand loam and half fibry peat, with a liberal allowance of sharp silver sand and small potsherds, broken bones, or charcoal, will be found a suitable compost. Strong tenacious loam had better be avoided, or at least used very sparingly. The peat and loam should be broken up into pieces about the size of a nut, and intimately mixed with sand, etc., previous to use.

Secure perfect drainage by placing an inch or two of potsherds in the bottom of the pots, and so arrange them as to prevent the soil being washed down amongst them.

ARTIFICIAL FLOWERS IN WAX.



THE following articles should be laid on the table before the operation commences:—A pen-knife, a pair of scissors, a piece of wire about three inches long, pointed at one end, and having a round knob of sealing-wax at the other, three or four smooth and slender rods of wood, a few sheets of wax of different colours, some wire of different sizes, covered with green tissue paper, for stems, and some very thin tin or brass to cut up into patterns. Some green wax should also be at hand in a melted state.

A flower must be chosen, for the first attempt, whose parts are very simple and easily imitated—the common primrose, for instance,

whose petals, or flower-leaves, are five in number, having in the centre five stamens, and being supported by a green calyx, or flower-cup. Take the blossom carefully to pieces, without injuring any of its parts; make the petals and calyx perfectly smooth by flattening them between the leaves of a book, or by placing them under a warm flat iron, and then cut out patterns of the calyx and one of the petals of the tin. The patterns must correspond with the originals, for the least inaccuracy here would spoil the work. The tin patterns must next be laid upon the wax, in the direction of the length of the sheets, and the five petals and the calyx cut from them.

Take one of the pieces of wire, being careful that it shall resemble in size the stalk of the primrose; dip it in green melted wax, and when cool, fix on the top, by the pressure of the thumb and finger, fine thread-like strips of dark yellow wax, to represent the stamens. These being firmly fixed, fasten on one of the petals in the same manner—by pressure—then a third, fourth, and fifth, putting them regularly round, and bending them outwards. This done, put the calyx in the palm of the hand for a short time, that it may become pliant; then form it to its natural shape round one of the little rods, and thus prepare it to be slipped on at the lower end of the stalk of the flower. When it is properly placed, press it tightly against the stem, and the whole will firmly adhere together; a few touches of dark yellow will be required near the centre of the petals; they may be given in oil-colours, or in water-colours mixed with ox-gall.

The root-leaves are generally made of cambric, and may be purchased with the wax, or at the artificial flower-makers; being afterwards dipped in a little warm wax to improve their appearance. Several other flowers are made with nearly the same facility, such as the snowdrop, the violet, the heartsease, the hyacinth, the pink, etc. When the petals are hollow, as in the tulip, crocus, or ranunculus, the wax is warmed in the hand till it is quite pliable, and the central part is gently rolled with the sealing-wax end of the pin. This expands the wax, and forms it, in the hollow of the hand, to the required shape. Sometimes the petals are wrinkled and rough, as in the gum-cistus, the red poppy, etc., and in order to imitate this appearance, the wax is well rolled, so as to make it thin and warm, and then crumpled up by the hand. If this is cleverly done, the wax petal, on being opened, will very nearly and beautifully resemble the peculiar appearance of the part it is intended to represent. Flowers, whose tints are delicately blended with each other, can only be imitated by forming the petals of white wax, and then tinting them with powder-colours, put on with a short-haired brush.

In this way, all striped or variegated flowers may be represented. The best way of making a convolvulus, is to pour some plaster of Paris carefully into a natural flower, and thus get an exact mould on which to form the waxen copy. A piece of wax is then cut out, the size and shape of the flower (which has been cut open and flattened), and formed carefully round the mould, uniting the edges very carefully at a part of the blossom where the join will be hidden by one of the coloured rays, which adorn the inside of that lovely flower. It is necessary to be very careful in putting the number of stamens

and pistils correct; a botanist will detect an error of this kind immediately, and the character of the flower is destroyed. The ends may be dipped in gum-water, and afterwards in powder of the requisite colour.

FERTILIZATION OF FRUITS IN HOUSES AND PITS.



THE necessary operation of fertilizing the blossoms of fruits grown under glass, is often overlooked by the amateur, if not by the professional gardener; and the loss of a crop of fruit is often the consequence, especially if dull and damp weather sets in at the time the trees are in blossom. I some time back threw out a hint respecting the artificial "setting" of fruits in orchard-houses, and doubt not that those who acted upon it have now an abundant "set." Let them beware now that they do not fall into the opposite error of overcropping the trees, merely because it seems a pity to destroy the young fruit. But the season being now at hand for the blossoming of the grape, my object in this paper is more especially to direct the attention of our readers to the desirableness of assisting the setting of this fruit also—especially the Muscat section, which I do not consider are to be relied on for a fair and even crop without it; and I know that it is the secret by which some cultivators are enabled to show that noble variety the Cannon Hall Muscat in perfection, whilst others do not get half-a-dozen full-swelled berries in a bunch. My plan is extremely simple; it merely consists in drawing the bunches very lightly through my hand twice a day for a few days, whilst the bunch is flowering, and afterwards give the stem a smart rap with the knuckles, to bring off the capsule from the stamens, and set the pollen free. The time for performing this operation may be known by gently shaking the vine, when the capsules that hold the stamens prisoners will begin to fall. If the weather is dry and hot at this period, they will be found to part from the bunch freely; but if gloomy and damp, it will be well to give the maximum amount of fire-heat allowable, and also to withhold some of the moisture usually thrown on the floors, etc.

That cucumbers and melons require the aid of the cultivator to assist their setting, by placing the male or "false" blossom (divested of its corolla) within the fruit blossom, is, I presume, known to all. Yet, that it is not sufficiently persevered in, especially early in the season, I know to be a fact; for as it can always be seen when the pollen is exactly fit for effecting its important office, it oftentimes happens that the first attempt proves abortive, and is only known, when too late to remedy, by the embryo fruit turning yellow, and dropping away. Therefore, it is safe practice to apply a second or third male blossom at intervals of a few hours to each fruit blossom that is wished should "stand;" and this applies with greater force to melons, for unless a crop is set at once, one or two fruits taking the lead will prevent all the rest from swelling: and for this reason none should be "set" until a sufficient number of fruits show themselves for a crop in nearly the same stage of growth.

H. H.

EVILS OF INDISCRIMINATELY WATERING PLANTS IN POTS, IMMEDIATELY AFTER BEING SHIFTED.



IO insert cuttings of plants, particularly those of a soft, woody, or succulent nature, into moist material, before the wounds made in preparing them are healed over, is often attended with fatal consequences, from the moisture finding its way into the pores of the plant, thereby causing putrefaction and decay. The woody parts of plants being more consolidated and less porous than their roots, are altogether less calculated to imbibe an undue portion of moisture, yet we find that even these do so to a most injurious extent; therefore, we may reasonably conclude that roots mutilated and placed in the same circumstances would have a greater chance, from their peculiar organization, to suffer from such a cause—nor can there remain a doubt that they do so. This points out as most injudicious the practice of turning plants out of their pots, reducing their balls, as the case may be, thereby lacerating every fibre, and placing every rootlet in a worse position than a cutting, and then finishing the operation by giving a good drenching of water, which, as we have already seen, must make dire havoc among the previously reduced channels by which the plant receives its food. Such is, in a great measure, the cause of delicate plants suffering so much from shifting of the check they receive, unless the operation be carefully performed, and consequent loss of time in recovering from its effects. Still, this is an every-day practice, that has descended to us hallowed by the custom of ages, and sanctioned by the highest authorities. Who ever heard of directions for shifting or potting plants, that did not end thus—“Give the whole a good watering to settle the mould in the pots, and the operation is completed”? After shifting or transplanting plants in hot weather, when a dry atmosphere causes, by excessive evaporation, an unusual drain upon the roots the necessity of a supply will soon become apparent; and administering it under such circumstances is less injurious than under any other, from the activity maintained in every part of the plant, rendering stagnation an unlikely occurrence. But even then, when practicable, it is better to confine them in a close moist atmosphere, which, with water overhead and shade, will enable them to exist through the medium of the leaves until growing has commenced, and the roots are in a condition to receive, without injury, the necessary supply.

It is, however, when there is a deficiency of heat, vegetation languid, and a corresponding danger from excess of moisture, that such precaution is most required, and the contrary practice most hurtful. Among seedlings of tender sorts, the mortality from such maltreatment is truly great; and when the impossibility of transplanting such without, in some shape, hurting their few and almost unformed spongioles, scarcely more consolidated than the fluid in which they are thoughtlessly immersed, is considered, their certain destruction is not to be wondered at.

The advantages these derive from the treatment described, led me first to examine more closely what I deem a matter of much importance.

Before quitting the subject I may add that the injury inflicted by such treatment is not confined to plants alone—the soil, also, is oftentimes irreparably injured. It has been placed between the sides of the pot and the root-bound ball containing the plant, where, being in a comparatively loose state, it receives the whole of the water that is considered sufficient to moisten the whole mass; as, where there is so little resistance, it is as effectually repelled by the hard, and much more by a dry ball, as by the sides of the pot. This reduces what has been added to the condition of a puddle, and in this state it stands a good chance of being baked as hard as a brick. At all events, it has been totally unfitted to afford that nourishment to the plant it otherwise would have done. Such consequences may be avoided by applying moisture gradually, but if some time is allowed to elapse there is not so much fear, even from the usual soaking, as the old and new material must, in the interim, have become equally dry—a state, let it be remembered indispensable to the thorough incorporation of such material.

THE GARDEN GUIDE FOR JULY.

THE FLOWER GARDEN.



ANOTHER lot of chrysanthemums should be struck this month, under hand-glasses, to make dwarf plants for the window and greenhouse in autumn. The pompones are the best for this purpose, and they may be stopped till the middle of August, to keep them dwarf and bushy. Train out dahlias neatly, but do not cut them severely, for the loss of foliage only weakens the plant. Put in cuttings of scarlet geraniums in the full sun, either in a sandy border, or in pots half filled with crocks, to be potted singly as soon as rooted. Get strong plants of chrysanthemums into their places in the borders, so that the heavy rains this month may establish them. Layer pinks, carnations, and picotees, and put pipings of the same into a gentle bottom-heat. Another lot of annuals may be sown early in the month, to keep up the gaiety of the borders to the end of the season.

KITCHEN GARDEN.

Sow another and last lot of scarlet runners, and French kidney beans, to bear till frost cuts them off; they will be very useful, as the early rows begin to fail. Hoe between all growing crops, and especially between potatoes. Sow successive lots of lettuce, turnip radish, salads, round spinach, peas, and turnips. Plant the main crop of celery in well-manured trenches. Plant also, from seed beds, cabbages of all kinds, broccoli, savoy, borecole, etc., etc., choosing, if possible, showery weather, to reduce the labour of watering. Top runners, and keep them well staked, but very tall sticks are not at all necessary, as they are only the more liable to be blown over by gusts of wind.

FRUIT GARDEN.

Runners of strawberries, struck in pots, may now be cut off, and the plants shifted into a size larger, or turned out into beds. Beds made now have the best

chance of becoming strong before winter, to bear abundantly next year. Continue to bud stone fruit trees, for orchard and pot culture. Thin out weak spray on all bush fruits, and foreright shoots on wall fruits. Maiden trees intended to be trained should be stopped, to make them break into side shoots, as a whole season's growth is thus saved. Rub off useless shoots on vines. Thin all fruit of which fine berries are required, either for exhibition or dessert.

GREENHOUSE AND STOVE.

The last lot of pelargoniums will be turned out this month, after being cut down, and must be kept rather dry till they begin to break, and then be syringed frequently. Shift all greenhouse plants required to bloom late, and stop any that are rather too forward. Cinerarias for winter bloom should have good culture now. Camellias may be repotted any time this month, but must have very small shifts. As pines colour, keep them rather dry; pines shy of fruiting may be induced to fruit by having water withheld from them, so as to check them for awhile, and then be well soaked, and kept warm and moist, and they will be pretty sure to fruit freely. In vinerias, give plenty of liquid manure to plants swelling their fruit, and be careful to keep the bunches shaded with a few leaves, by tying the laterals over where necessary.

TO CORRESPONDENTS.

PEAR TREES.—*J. R. T.*—Your trees have no doubt sent their roots down into an ungenial soil, and are touched with premature decay. When you cut in the roots, you should also have mulched the surface round the stems with rotten dung to induce a growth of surface fibres. We should advise you to cut close in a selected number of branches this season to get breaks next spring; this would produce a new set to be regularly laid in, and next year we should cut in another lot, and so renew the whole of the wood in the course of time; but if the trees were ours we should plant new ones, and plant them on platforms made by taking out the soil, so as to form a circle of six feet diameter and three feet deep. A layer of brick-bats, stones, chalk, cinders, or any other kind of paving material is then to be thrown in a foot deep and rammed hard, and the whole filled with good loam, without manure. This should be done early, to allow the earth to settle well before planting. Perhaps something might be done with your present trees, towards promoting the formation of fruit buds for next season, by nipping out at once the point of every side shoot, and of course cleaning away all superabundant growth. This advice, however, is given in ignorance of the aspect in which the trees are planted, the nature of the soil and climate, and the position of trees in respect to each other.

GREENHOUSE PLANTS IN AUTUMN.—*Zinnia.*—The best plants to make your greenhouse gay, during the next few months, would be Scarlet Salvias, double Petunias, Senecios, Crassulas, Abronias, Gesnerias, *Statice Halfordii*, Brugmansias, *Erica pulchella*, Asters, Balsams, *Clintonia pulchella*, and any showy annuals sown in June. Later in the season Pompons *Chrysanthemums* will come in, and make the stages very gay.

AGAVE AMERICANA.—*Subscriber.*—All the Aloes require a soil composed of rich loam, a little old dry choppy dung, leaf-mould, and a good admixture of broken crocks, lumpy charcoal, and brick rubbish. The pots should be well drained with large crocks at the bottom, then a layer of smaller ones, and then some of the roughest of the soil. They are propagated by suckers, which may be taken off now if of moderate size, and stuck in sandy peat and loam with bottom heat. They like sun, and during summer plenty of water; in winter very little, or none at all. Broken leaves may be cut off close with a sharp knife, but the less the plants are cut or injured, the better. Do not shift to larger pots unless the pots are already full of roots; but if they really require more room, shift at once without breaking the ball, and give plenty of water and shade for a week.

July.

When growing, an occasional sponging of the leaves with tepid soft water will do them good, but they must not be exposed to the sun while the foliage is wet.

PROPAGATION OF CLEMATIS.—*S. Jones.*—The best way to propagate Clematis is to select a vigorous shoot and lay it down. Let it spring up again, and then nick with a sharp knife the back of every joint, and peg each joint into a pot filled with a good potting compost, and plunge each pot to the rim. Every joint will thus make a plant, and every plant will be better than those from layers made in the ordinary way.

TIFFANY HOUSES.—*P. W. Bagshot.*—The larger you make your tiffany house, the more secure will it be against frost. Roses, Azaleas, Camellias, and all nearly hardy fruit trees, such as the choicer kinds of pears, peaches, etc., do admirably in these houses, but they are quite unfit for soft-wooded greenhouse plants during winter. You should build the house in a substantial way, in order that it may be proof against storms, and it will be best to use stoutest tiffany.

HYACINTHS.—*Constant Reader.*—Your hyacinths have done growing now, and you can do nothing but store them away till the end of September, and then plant them out in rich sandy soil six inches deep, and in the spring cut away the bloom spike as soon as it can be removed without injuring the leaves. The next autumn you may have them potted for flowering.

PLANTING FOUNTAINS.—*C. E. C., Moreton.*—For the vicinity of a fountain nothing can be better than Pampas grass, *Elymus glauca*, *Tritoma uvaria*, Hydranges, Fuchsias, *Lysimachia thyrsoiflora*, *Enothera Fraseri*, *Calla Ethiopica*, *Osmunda regalis*, *Athyrium filix femina*, *Arundo donax*, and other such plants of graceful habit and fond of moisture. You cannot have anything grand to flower in winter, but you can plant the bank with Winter Aconite, Christmas Rose, and Primroses. In a sunny, dry position, one or two *Lauristinas* would be useful for winter bloom.

CINEBARIA MARITIMA AND CERASTIUM.—*E. W. H., Farrington.*—*Cineraria maritima* is a hardy plant, and on elevated positions, where the soil is chalky, it will survive the winter. But in gardens it is generally taken up and potted, with liberal drainage, and may be wintered in a frame or pit. It may be propagated either by seeds or cuttings. The cuttings do not root quickly, but hardly one would fail if put in three-parts sand and kept moderately moist. It can be propagated at all seasons without bottom heat, but April is the best time for novices. *Cerastium tomentosum* may remain out all winter, and be taken up in the spring and divided. If wanted in quantities, the young tops may be struck either with or without the help of heat.

RANUNCULUSES IN WINTER.—*R. E.*—In Holland, in order to have *Ranunculuses* in bloom in winter, the bulbs are planted in July or later, up to November, in frames or cool dung-beds. Should the weather prove bad in the autumn, lights are put on the frames, and removed whenever the external temperature of the air will allow.

VERBENAS.—*P. P. T.*—Your verbenas wanted bottom heat to give them a start after potting. It is common enough for people who work without the aid of artificial heat to lose all their plants in spring, through repotting them. In future, if you succeed so well in keeping your plants through the winter, leave them alone until quite the end of April or the beginning of May; indeed, you might have left yours until the time to plant them out.

LILIES OF THE VALLEY.—*A Perplexed Subscriber.*—It is probable that your lilies of the valley are starved, through being kept so long in the pot without a change of soil. They should have a shift into a larger pot in September, or better still, shake them out completely, and repot them in rich turfy loam. To force them into early bloom, place them on a hot-bed in February, and when they have done blooming, keep them in a warm place until their leaves are thoroughly ripe and then put them out in a sheltered place, where there is no danger of the foliage being torn by the wind.

APPLE TREES.—*C. W. H.*—Your apple trees are wrong at the root. You do not say what age they are, or in what soil they are growing. You can do but little for them now; but it would afford some help, if some of the surface soil was removed, and replaced by a mixture of half fresh loam and rotten dung well chopped over; lay the mixture down, and tread firm. In autumn they must be lifted and root-pruned.



HIBISCUS COOPERII

HIBISCUS COOPERII.



HIS splendid species of *Hibiscus* is a native of the hottest parts of the Australian colonies, where it was first discovered by Sir Daniel Cooper, Bart., of Woollabra, near Sydney. The plant is rather delicate, but when properly treated it grows freely, and is extremely beautiful. It has been described as a greenhouse plant, but to grow it well it requires careful stove cultivation. The young stems are of a deep red colour, also the footstalks of the leaves and the stipules that accompany them. The leaves are lanceolate or elongate-ovate, wedge-shaped at the base, pointed at the apex, and irregularly bluntly toothed. They vary considerably in colours but the prevailing tints are carmine-red, with patches of creamy white in the outer parts of the blade, with more or less of light and dark green, dappled in the line of the midrib; and numerous as are the plants with highly-coloured leaves, there are few that equal this in the abundance and richness of its tones of red; and when it flowers, the flowers are not surpassed in splendour by any other species of this noble family. The petals of the flowers are of an intense scarlet colour, but the base of each is blush, which breaks into the scarlet in delicate veins, the centre of the flower being blackish crimson. All the stove species of *Hibiscus* do well in a soil consisting wholly of tough fibrous peat, or the most mellow fibrous loam that can be obtained. *H. Cooperi* may be quickly struck with a good heat; but care must be taken not to make the cuttings too wet, or they will perish.

THE CULTIVATION OF CACTI.



THE majority of the genera are sun-loving subjects, and, as a consequence, the first thing to be taken into consideration is, to get your house so situated as to insure the greatest amount of direct light; the best aspect will be due south; a lean-to house is the best, with good clear glass, to which the plants must be as near as possible. The genera *Epiphyllum* and *Rhipsalis* are exceptions to this rule, and prefer a little shade in the summer, as they mostly grow in the forests; but in any house there are always some parts more in the shade than others. The plants are not damaged by the sun, but will grow more luxuriantly in the shade. It is not easy to get the house too hot for Cacti in the summer, but they will thrive well in a temperature of 60° to 80° with sun, and in winter the majority will bear a minimum of 40° with dry air; though the genera *Rhipsalis* and *Epiphyllum* must be kept at 55° to 65°, or they will protest by looking very yellow. Most of these plants being natives of those parts of America lying south of the equator, they, as a consequence, get their warmest season when we get our coldest, which gives them a tendency to grow during our winter, and a predilection for rotting

if not kept perfectly dry. As above stated, the whole of these plants being American, they should not be repotted in early spring, as is the common practice—which practice seems to have originated from the fact of most plants starting into growth on or about that time. I have often thought, that if amateurs and gardeners were to think more on this subject, they would at once see the folly of supposing that all countries had their spring at the same time as we have in England; it matters little with most persons if the plants come from east, west, north, or south, they must be potted in our spring; and as the plants will not grow out of their season, the soil gets stale, and when the roots do begin to grow they find the condition unfavourable, and the result is stunted growth, and sometimes death; not through a wrong compost, but unseasonable potting. The potting of Cacti should be left until June or July, when they will be on the point of starting into growth. The best compost is loam, with silver sand and broken bricks; the quantity of sand must be regulated by the stiffness or otherwise of the loam; the object being to make the whole sufficiently porous for the water to pass through freely. As a rule, one gallon of sand to three bushels of loam and one bushel of finely-broken bricks will suit for the genera *Opuntia*, *Echinocactus*, *Echinopsis*, *Cereus*, and *Mammillaria*; for *Epiphyllum* and *Rhipsalis*, a mixture of rough peat and loam, with a little sand and rough crocks, is the best. Such as *R. cassytha*, *junalis*, *saglionis*, and *mesembryanthoides* may be grown on pieces of fern stems in baskets or pots suspended the same as orchids, and very interesting objects they make; *Cereus flabelliformis* and *leptopes* succeed best suspended in a pot, with the ordinary soil; *C. grandiflorus*, *Macdonaldicæi*, and the other night-flowering species, grow best planted in the back border of a stove, with a tolerable amount of moisture in the air; it is not necessary to give them much soil, as they get most of their nourishment from their aerial roots. When the plants are to be potted, the whole of the small fibres of the roots should be cut off. This is a very particular point in the cultivation of this class of plants, as it enables you to get the plants into small pots; and if left on, they decay, and so do more harm than good, by making the soil impure. Amateurs, as a rule, are very shy of cutting the roots from their plants; but a good cultivator of Cacti has not the least hesitation about the subject; and it is probable that they lose most of their fibrous roots during the dry season, in their native habitat. The soil should be made quite firm in the pot, and well drained, taking care to put enough rough pieces of soil on the drainage to prevent the soil from getting amongst it, and so defeat the object for which it is placed there. Manure should be specially avoided, as it will cause the soil to get charged with impurities, with the least excess of water, which impurities the plants will take up, and though they may look green and healthy, may some day be found quite dead. Some persons recommend manure, but, after sad experience, I say away with it. I also know persons who grow their plants in nearly all manure, but they are grown for sale, and their profit consists in the death of the same. Others, again, recommend lime rubbish being mixed with the soil—which practice has

originated from the fact of oxalate of lime being found to constitute a great portion of the substance of these plants; but lime rubbish from the debris of old buildings is very different from that found in the natural soil of the plants, and the effect on the roots is to cause them to become stunted, and what horticulturists call clubbed; therefore my advice is, if you want your plants to grow well, don't use lime rubbish.

When the plants have been potted, they should be kept without water until they show signs of growth; never mind if they don't ask for it until two or three months after potting; don't give it to them until they do, for they always contain enough moisture to enable them to start, and until that start is made the roots have not begun to grow. When the plants have started into growth they may be watered about once a week, for the first month; after that, twice, with a good syringing every other evening before shutting the house. This treatment may be continued until the end of August, when the syringe must be laid aside; after September the watering must not be oftener than once in fourteen days; from October to March the genera *Mammillaria*, *Echinocactus*, *Cereus*, and most of the *Opuntias* must be kept quite dry. As the *Phyllocacti* flower in the early spring, they must get water about once a month during the winter. *Epiphyllum* and *Rhipsalis* may be moderately dry, but they will not endure so much drought as their more succulent allies. It is not necessary to pot the plants every season, as they like to be pot-bound: some do well in the same pot for five or six years. Should any plant be found to have lost its roots, or show signs of decay, the infected part should be cut clean out at once, and the plant turned up to the full power of the sun till it begins to show fresh roots, when it may be repotted, and watered with care. This rule of turning the plants up to the sun should be especially attended to with newly-imported plants, as they require all superfluous moisture cleared from them; their roots should be cut off, as when dead they act like string, conducting moisture to the plants. To the neglect of cutting off the dead roots I attribute the many failures to grow the Turk's Cap cactus (*Melocactus communis*), although this species evidently does not increase in size after forming the cap or flowering point, yet it may be kept alive some years.

MODES OF PROPAGATION.—The genera *Rhipsalis*, *Phyllocactus*, *Cereus*, and *Opuntia* are easily increased by cuttings, which should be taken off in May, and laid in the sun until rooted, when they should be potted and watered carefully; though *Rhipsalis* and *Phyllocactus* may be potted at once, and kept dry about fourteen days, when they will be rooted, and may be watered. *Echinocactus* and *Mammillaria* must be increased by offsets. *Echinocactus* requires the top to be cut off, which must be exposed to the sun until rooted; the old plant will throw out young ones, which may be taken off the next season. As a rule, the *Echinocactus* is slow in throwing offsets, and care must be taken not to let the plant get any water until it shows signs of doing so. Patience is a virtue in great demand in the propagation of this section of the order. The slender-growing species are often grafted on stronger and faster

growers, though care must be taken not to select for a stock one as celebrated for vigour as the scion is for want of it, or your labour will be in vain. As a stock for the smaller-growing Echinocacti, *Cereus tortuosus*, or *colubrinus*, are the best; for the larger, *C. peruvianus* and *gemmatus*. In grafting, care must be taken to cut the two ends rather convex than concave, as they are apt to shrink a little, which would cause a separation, and so spoil the graft; the scion must be tied firmly to the stock, taking care that the edges meet, or at least one of them. The best plan to insure against accidents is to put three sticks into the pot, and tie them together above the plant, thus causing a continual pressure from above. In grafting *Opuntia clavrioides*, you may cut a cuneiform notch in the stock, and cut the scion to fit tightly; keep them firm with a stick on each side, and a thorn run through the graft. Some of the smaller species of *Cereus*, as *C. tuberosa*, may be made pointed, with a corresponding hole in the stock—in all cases taking care not to disturb the plant when once grafted. When the operation is finished, the plant must be put into a close frame, or the shadiest part of the house, until it is out of danger. Epiphyllums are generally grafted, but not necessarily. The common stock used is *Pereskia grandifolia* and *Blea*, but *Cereus speciosissimus* and *triangularis* make very good stocks, these plants being stouter, and more in proportion to the scion, though *Pereskia* stocks are more to be depended upon than *Cereus*. Cuttings of *Pereskias* intended for stocks should be put in in spring, selecting the young straight shoots of the previous season, about six inches long, or according to fancy. About September is the best season for grafting Epiphyllums. The scion should consist of one or two joints; cut the outer bark off about one inch on each side of the scion, split the stock about the same length, put the scion in, and tie or pin it with a thorn, according to which stock you use; the plants must then be put into a close frame, and laid on their sides until united, which they will do in about six weeks, when they may be stood upright, and gradually hardened off. Most of the species may be raised from seed, which should be sown as soon as collected, if possible, and put into a temperature of 60°. The young plants grow very slowly at first. When potted off they should be placed near the light. It is best to let them remain in the seed-pot until the following season, as they are very apt to damp if they are potted off too soon. Seed collected abroad should be left in the pulp, which, being its natural protector, prevents the air acting on it, and drying it up. Packed in a small tin box, it may be sent any distance without losing its vitality. The best flowering varieties are *Cereus speciosissimus*, and its varieties, as *C. Ackermannii*, *Jenkinsoni*, *splendens*, and others; these are the forms most commonly grown in cottage windows. The genera *Phyllocactus* and *Cereus* produce many fine-flowering varieties.

HYBRIDIZATION.—This may be performed by any person, as the stamen and pistils are so very distinct, and the pollen produced in abundance—which may be preserved for some time, if kept in a bottle hermetically sealed. I have not met with any successful attempt to cross *Mammillaria* with *Echinocactus*, or *Opuntia* with

Cereus, though I know of no cause why they may not be, as the differences in the flowers are not differences of structure, but merely degrees of development; such as a greater or lesser number of stamens and petals, or in the absence in some, and length in others, of the tubes of the corolla, excepting that it may be that the pollen tubes might be too strong for the distance they have to grow from the apex of the stigma, or *vice versa*.

The chief points to be observed in the foregoing directions are, the light, time, and mode of potting, taking special care not to be afraid to cut off the roots. The watering—which should be given with a rose on the pot—when given, let it be enough to thoroughly soak the soil. It is best to hold the pot as high as you can, so that the water may fall on all parts of the plant, which serves the double purpose of washing and watering at the same time. Be sure to give them a good drying in the winter, upon which depends the success in flowering them the next season.

Some few species, as *Opuntia vulgaris*, and *Rafinesquiana*, and *Echinopsis Eyriesii*, are hardy in the south of England; and I have no doubt that many species of *Opuntia* and *Echinopsis* would do very well in cold frames in winter, and the open air in summer. For an amateur, the Cacti are the best class of plants to cultivate, as they offer the greatest scope for number of species, and require so little attention. In a house 20 feet by 12, from 400 to 500 species may be grown; in the summer the house can be left night and day with air; and if the owner had no person he could trust, he might lock the house and leave them a week at a time without fear of harm. In the winter, if he should be obliged to leave home, the only thing would be to get the heat looked after, and his pets would welcome him home with as fresh an appearance as when he left.

SEMPERVIVUM ARBOREUM.



THIS *Sempervivum*, which is perhaps better known as the "Tree Houseleek," is one of the finest of the succulents of free growth for the greenhouse of the amateur cultivator, and for the window. It is readily multiplied, and it is so remarkably free in growth, that the production of a specimen with a fully-developed head is, comparatively speaking, a very easy task. The side-shoots taken off an inch or so from the main stem, and inserted in small pots filled with light sandy soil, will, if placed in a sunny position in the greenhouse, soon strike and become established. To encourage a vigorous growth, repotting annually, or every second year, will be necessary; but as overpotting is most injurious, pots one size larger than those previously occupied must be employed at each shift. A thorough drainage is essential, and a compost consisting of turfy loam, small crocks, and sand is the most suitable. There is a fine variety, with deep bronzy-purple leaves, and one with variegated leaves, and these are known

August.

as *Sempervivum arboreum purpureum* and *S. arboreum variegatum*, respectively. A moderately stout stake must be put to each plant,



SEMPERVIVUM ARBOREUM.

to hold it upright and prevent the weight of the head snapping the stem; but no other training is required.

RIPENING OF FRUIT.



FRUITS designed to be kept for a considerable time should be gathered with great care, some days before the ripening process commences. The process of ripening on the tree, which is the natural one, seems to act upon the fruit for the benefit of the seed, as it tends to the formation of woody fibre and farina. When the fruit is removed from the tree at the very commencement of ripening, and placed in a still atmosphere, the natural process seems to be counteracted, and sugar and juice are elaborated, instead of fibre and farina. Thus, pears which become mealy and rot at the core, when left on the tree to ripen, become succulent and delicate-flavoured when ripened in the house. Fruit-houses should be cool, with non-conducting walls, or with exterior and interior walls, or a room within a room. Thus the external atmosphere, which either starts the saccharine fermentation, or conveys the agents which produce it, can be admitted or excluded at pleasure. It is possible, however, to preserve the atmosphere at so low a degree or for so long a time, as to destroy the vitality, and therefore all power even to resume the ripening process. This is especially the case with some varieties of the pear. Experience proves that, for the common varieties of the apple and pear, about forty degrees of Fahrenheit is the temperature best suited to hold this process in equilibrium. Different varieties of fruit require different degrees of moisture and heat, according to the firmness of the skin, the texture of the flesh, and the natural activity of the juices. Thus some varieties of the pear will ripen at a low temperature, and in a comparatively dry atmosphere, while others are improved by a warm and humid air.

THE FORMATION OF A GREENHOUSE FERNERY.



IN the formation of a greenhouse fernery it is not enough to gratify a particular taste, which, by the way, may happen to be a bad taste; it is essential to provide for the plants, so that there shall be no struggle with difficulties afterwards to keep them alive. If the work is well done, the ferns will grow and fill their owner with delight, and nothing short of the most luxuriant growth possible should satisfy the cultivator. We occasionally obtain a peep into ferneries that are founded on a delusion. We see fantastic pyramids and arches studded with myriads of sharp projections in the fashion of stalactites, the colouring of the whole a repulsive tone of bright yellowish grey, the material being furnace clinkers artistically coloured, with not a crumb of soil for the ferns to root in except what can be thrust into wretched little "pockets" of the capacity of a tea-cup each. There may be in the house a few good ferns in pots on the

floor or surrounding a fountain in the centre, and a few more very bad ones in pots thrust into unhappy chinks in the fanciful rockery ; but the affair at best is only a costly extension of the idea on which a peep-show at a country fair is founded. The sham stalactites are the attraction, if there be any attraction, and the deluded folks who declare it "beautiful," declare also by that utterance that they have not the least idea of what a fernery should be, or what ferns require. A fernery is for ferns, and must be so ordered that ferns will thrive in it. One good tuft of maidenhair or marine asplenium, beaded with moisture and glistening with health, is to be preferred to all the painted clinkers and childish frippery that was ever seen in a house of this kind, no matter what it may have cost, or how much weariness and solicitude may have been entailed upon the owner to secure its construction. We must have first of all a mass of soil, that the ferns may have abundant root-room, not simply to *live*, but to *grow* and *increase*. For the rockery there is nothing better than brick or stone, because of the retention of moisture by these materials and the liking of ferns to root next to their surfaces, and even into their substance. Circumstances may prohibit the selection of the material known to be the best, and we must then be content with the next best. Hard vitreous substances, impenetrable by moisture, are unfit for rockeries for ferns under glass, yet they may be used if nothing better can be obtained, provided always there is a large body of soil and abundant openings amongst the facings for the searching roots of ferns to push their way for nourishment.

In towns, the most convenient and suitable stuff for rockeries is the waste of the brick-kiln. The large masses of brick that come from the base of the kiln, and which are commonly known as "burrs," are as good for the purpose as can be desired ; their crannies and crevices suit the rooting habits of the plants, and they are suitable also in colour, and after a time a slow decay of their surface takes place, the result being that troops of mosses come of their own accord, and dot the structure with patches of emerald. Stone is better still, if in rough blocks, and sandstone especially, if it can be had, will favour the well-doing of every inmate of the house. We have seen roots piled up and planted, and they answered well ; but they decay too fast, and are apt to become suddenly clothed with a myriad kinds of objectionable fungi, which are difficult to eradicate. The best staple soil for the purpose is good peat ; but as in many districts this is a costly material, it is necessary to eke it out. Our rockery was built by a bricklayer who thoroughly understood the requirements of the case. We made a bed of loam for the foundation, and upon this the peat was piled or thrust in as the work proceeded, and when the bricklayer had finished his work, we found plenty of large and small pockets opening into the solid bank behind ; in these the plants were placed, and filled in with a good mixture of peat and sharp sand.

Drainage is of more importance with reference to the comfort of the cultivator than the well-doing of the ferns. It must be understood, however, that the accumulation of stagnant water at the base

of the rockery is an evil to be guarded against, to say nothing of a possible sloppy state of the paths or pavement, if the house is unprovided with drainage. Let it suffice that this point has been mentioned, for in practice it is of less consequence than in theory. If the fern-house stands on a tolerably dry soil, and the cultivator acts judiciously in the management of it, there will never be such an accumulation of water as will be objectionable or inconvenient.

In the selection of ferns, the matter for first consideration is their relative hardiness. If the house is heated, there is a wider range for selection than otherwise, but in a house wholly unaided by artificial heat an immense number of the most beautiful kinds may be grown to perfection. If the question were pressed for a decisive answer, whether, speaking in a general way, a fern-house should or should not be heated, we should pronounce it highly desirable to heat it to ordinary greenhouse temperature, both because in that case it might suit, *cæteris paribus*, for full nine-tenths of all the ferns known, and because also it would be enjoyed in all weathers, and would be almost as bright on New Year's Day as at midsummer. Charcoal stoves and hot-water bottles and candles are available to repel frost where there is no proper heating apparatus; but these are troublesome and very apt to fail at the moment when they are most wanted. Therefore our advice to all is, be content with the proper range of your opportunities; plant such ferns as the house will accommodate without necessitating a strain upon your attention at any time, for when a hobby swells out like a nightmare into a gigantic vexation or anxiety, it ceases to amuse, and increases instead of relieving the cares of life.

At this point the whole subject of fern-culture opens before us, and it is therefore time to stop. It must suffice to say here that sufficient room should be allowed in planting for the plants to extend themselves and attain perfect development; that they should be planted firm and filled in with a good mixture of peat and sand, and in many cases it will be necessary to *build* them in, to secure to plants of peculiarly noble aspect commanding positions. The after-attention consists chiefly in watering, which must be attended to with regularity, copious supplies being given in summer, but very little in winter, and during frost none at all, unless the house is heated, in which case the supplies must be continued in moderation. Ventilation will be necessary, but ferns need less air than most other plants, and especial care must be taken to avoid exposing them to cold draughts in spring, and to the exhaustive sultry breezes of high summer. At such times keep the house close, and promote humidity by sprinkling the floor with water.

INVADERS, VISITORS, AND SETTLERS IN OUR GARDENS.



OUR gardens are sometimes invaded by a wild species of quadruped which comes into them at times, seeking, as do most wild beasts, that which it may devour—scrambling in the first instance over our walls, or making its way through holes in our palings, or gaps in our hedges, in its search after food. It is of course not a lion, or tiger, nor even a lynx or fox; but however it may differ from all these creatures in its outward appearance, it has really much that is like them in the structure of its body, for all quadrupeds are like each other in the form and arrangement of the bones which compose their skeletons; just as in the construction of houses there is much that is alike in the beams and rafters, however in their external appearance they may differ from each other. In the skeletons of all quadrupeds is found the backbone, or spine, composed of many separate *vertebrae*, or small bones fitted into each other, so as to make the whole flexible, with the skull at the end, which contains the brain. Branching out from the backbone, or spine, are the ribs, which bend round and protect some of the most tender internal parts of the body; while in the bones of the four legs, there is much alike in every quadruped, both in their form and arrangement, as well as in the muscles which move them in life. It is therefore *in size* that the invader whom we are going to describe differs most from any other quadrupeds that roam wild about the forests and deserts; and in this respect the difference is very great. In the skeleton of the elephant, for instance, which is the largest of all quadrupeds, we know that it is composed of thick, heavy, solid bones, almost as hard and strong as if made of iron or stone, while the whole skeleton is perhaps two and a half yards in length; and in the case of the animal which sometimes invades our gardens, the bones of which it is composed are as fine and delicate as if carved in ivory, and the whole being but about two and a half inches long, it could easily lie in the palm of our hand—for the creature of which we are speaking is but a mouse, the very smallest of all quadrupeds.

Two or three different kinds of mice come to us at times from the fields, and if they find that they can supply themselves with food enough among our vegetables, and such seeds and fruits as are to be found lying under our trees, and especially if we happen to grow Indian corn, or have some bushes of hazel-nuts and filberts—if only such delicious provender as this is to be reckoned on which can be stored up, they will become settlers with us, and make their nests in some sheltered nook beneath the root of a tree, or under a tuft of grass, or in some cranny in a wall, and lining it carefully with moss and dead leaves and hay, will there live and bring forth, and rear their young. As they have usually as many as six or seven young ones at a time, and two or three families in a year, it will make all the difference to us and our gardener when such invaders become settlers.

The mouse which most often lives in our gardens is the wood-

mouse, or as it is sometimes called, the "Long-tailed Field Mouse"—a pretty, gentle, timid creature after all, with large, bright eyes, and broader and rounder ears than those of the house mouse, and with a tail nearly as long as its head and body. Like the squirrel, it lays up stores of food for the winter—seeds, nuts, and grain, etc. It probably sleeps a good deal during the very cold weather, and yet may be seen venturing forth even when the snow is upon the ground to forage for food if its store is becoming exhausted, and rather than starve will burrow down to our crocus and snowdrop bulbs and nibble them away. Since it feeds principally on vegetable food, it lives on good terms with the other inhabitants of our gardens, and has only to fear being caught by some stray cat or owl who is on the look out for mice and moles. It is curious to think of the quiet snug life which our little mice settlers may lead all the winter, feeding and sleeping alternately in their warm nests; and yet cases may arrive when, perhaps, the winter being longer than usual, and their storehouse becoming exhausted, and nothing to be had in the garden that will suit them, they will make their way out beyond its boundaries again, and get into some neighbouring wood or plantation, where beech-nuts and acorns are still to be found in the dead leaves at the foot of trees. A near relation of the wood-mouse is a somewhat still smaller animal, and is likely only to pay us very short visits. It is called the harvest mouse, and living principally on grain, constructs for itself a nest amidst the stalks of corn, like a round bag hung among them, formed of leaves and grass woven together. The entrance into this curious nest is contrived so as to close as with a spring after the owner has entered it, or when he leaves it, filled with his young ones or with his store of food. This mouse is able to catch hold of objects, such as a twig or stalk of corn, with the end of his tail, like an opossum, so as to swing himself from one twig or stalk to another. Mice have such large families, and increase their numbers so fast that a naturalist who wanted to ascertain how fast they would multiply, put a pair of harvest mice into a large box, together with a quantity of grain, and on opening the box three or four months afterwards found that there were one hundred and twenty mice in it.

The mole is another quadruped which is sure to invade our gardens, or pay them occasional visits, though we do not often meet with him above ground. In a neighbouring field we may perhaps see the little billocks of earth which moles bring to the surface after burrowing out the subterranean passages which they form, and even in our own gardens such traces of them are to be found when they make their way under our walls and fences, in search of earth-worms, which form their principal article of food. From time to time we do, however, get a sight of moles, and though we may fancy them at first to be ugly and shapeless creatures, it is worth our while to examine them well, that we may learn how curiously their form is suited to their manner of life. First of all, the long shapeless body is covered with a most smooth and velvet-like fur, which will turn any way, so that while groping about underground it enables the creature to slip easily through the passages it burrows out, either

backwards or forwards. The head is joined on to the body without any neck, and has a long flexible snout, which penetrates the earth like a ploughshare, while its short fore-legs have broad paws like fat hands turned outwards, with five fingers and sharp pointed nails, just fitted for first helping to rake away the earth, and then to throw it back on each side as the creature ploughs its way along. Since the mole spends its life in the dark, its eyes are very minute, and perhaps enable it to see with a very little amount of light, while its ears are scarcely visible at all.

Though the mole travels so much underground, and does not require shelter like most other animals, it has still a home of its own. In the centre of one of the largest hillocks, or mole-hills, will be found its nest, and nothing can be more curiously or artfully constructed than these abodes. They are formed like little fortresses, composed of two round galleries, one above another, communicating with each other by five upright passages, while other "runs," or tunnels, branch out from the lower gallery in every direction, and extend over a considerable space. In the centre of the fortress is the principal apartment, in which the creature dwells, and from which, if attacked, he can make his escape by any of his secret passages. He is not obliged to be always burrowing his way through the earth in search of food when such a system of tunnels has been executed by him, but can use it as a sort of hunting-ground around his fortress; and we may fancy the proprietor of such a territory running about his underground passages in search of worms, and living rather at ease when once he has formed his abode, and dug his tunnels that communicate with it. He has only to be careful not to show himself above ground too often, if an owl happens to dwell in his neighbourhood, and to beware of the traps of the mole-catcher, who knows so well all his ways and habits. When the creature has to bring forth and rear its young, it forms a different sort of nest in one of its raised hillocks, carefully constructed with drains, so as to carry off moisture, and which nest is supplied with plenty of leaves and warm materials for bedding. Moles do us very little harm in our gardens, since they do not eat vegetables, and do eat many animals of which we might otherwise have too many. The underground passages they make seem also to break up the soil, and help to drain it. Earth-worms are said to be so afraid of moles, who prey on them so constantly, that no sooner do they feel any shaking of the ground about them, like the approach of their enemy, than they wriggle up to the surface of the earth; and it is a still more curious fact that those birds who also make worms their food seem aware of this, so that thrushes and lapwings will be seen knocking the earth with their bills, and stamping with their feet round the holes of worms, in order to bring them up, when, of course, the poor worm becomes the prey of the bird, instead of the imaginary mole. Sometimes the soft velvety skins of moles are used to make gloves, and pouches, and purses, and we have even heard of a gentleman wearing a waistcoat made of mole-skins.

(To be continued.)

THE HYDRANGEA.



HERE are several distinct species of *Hydrangea* in cultivation, but the best is *H. hortensis*, which produces pink flowers when grown in rich loam, and blue flowers when grown in either peat or loam in which there is a decided trace of the salt of iron. It is one of the best plants for the conservatory or entrance court, and looks well amongst groups of pot plants near a summer-house or fountain. The shortest and surest way of insuring large heads of flowers with the least possible trouble, is to procure, during the month of May, cuttings from the lower part of the stems of strong plants, and young shoots with four or five joints; not more than five joints are preferable to those with three. Remove the two lowest leaves from the cuttings, and pot them singly in thumb-pots, in a mixture of leaf-mould and peat, with a very little sand. They must then be placed on a moist bottom-heat of not more than 60°, either over a propagating tank or a frame over a dung-bed. They will require to be kept moderately moist, and will bear to be closely confined until they form roots. Air should be given moderately after the lapse of a week, and thenceforward increase the supply, so that by the time the pots are filled with roots the plants will be hard and thrifty. When propagated on a large scale, the cuttings may be dibbled into wet sand placed over a tank or dung-bed; but it is better to pot them singly at first, as it is a decided gain in the end. When the thumb-pots are filled with roots, shift to 60-size pots, using a compost of peat, leaf-mould, and loam from rotted turf, equal parts of each; keep them in the greenhouse or warm pit, water frequently overhead and at the root; give plenty of air, and keep the plants near the glass. When these pots are full of roots, shift into six-inch pots, the compost to be strong turfy loam, full of fibre; turfy peat, rotten manure, and leaf-mould, equal parts; no sand. For drainage of these pots use only one large oyster-shell, placed over the hole in the pot hollow side downwards. The plants should be shifted into these pots without breaking the balls of earth formed in the 60's, and at once placed on a bed of coal ashes, or a hard pavement in a shady place out-of-doors, or plunged to the rim in a bed of cocoa-nut refuse. They should have abundance of water, and by the end of October should have attained a considerable size, and have ripened plenty of hard flowering wood for the next season. The plants should be housed at the end of October. A cold pit suffices for their protection; they should have a little water occasionally, and be kept clean, as they lose their leaves. In severe weather a little care should be taken to prevent their being severely frosted. From this point the cultivator may proceed either to force a few at a time or allow them to bloom naturally as the season advances. The first thing to do is to cut them back to about six eyes from the bottom of each well-placed ripe shoot, removing any weak inside shoots that might crowd the head without improving the plant. Next give them a shift to pots seven and a half inches in diameter, with the same soil

August.

as the last, and with a mulch of rotten manure an inch thick on the top. Ordinary greenhouse temperature will set them going very early in the spring, and the blooms will show immediately. Provide some neat green stakes, slender, but strong, eighteen inches in length, and tie every shoot, as soon as the bloom is visible, loosely to a stake, as when the flowers are fully expanded their weight, when wet with a shower, will sometimes cause them to fall over and break the stems. All they need after this is *abundance of water*. They can scarcely have too much at the root, or be too much sprinkled overhead. When the roots begin to run upon the surface, assist them with liquid manure, rather strong, once a week, and by this time the blossoms will be expanding and colouring, and after acquiring their proper character, will continue in perfection a longer period than any other plant in our gardens. These plants are not to be shifted again until next spring; then they are to be cut back to about eight buds from the base, and shifted into ten-inch pots, and they will make enormous specimens. The next year they may be shifted into fifteen-inch pots; and after that it is not advisable to increase their bulk any further. A few cuttings, to furnish small useful plants, should be put in every year, in April or May; or, if there be no convenience to strike by bottom-heat, they may be rooted under bell-glasses without heat in June; but it is best to strike them not later than the first week in May to insure the formation of ripe wood for blooming the following year. For ordinary purposes the most useful are yearling plants, which, when they have bloomed once, are to be destroyed. To force them is a mere matter of temperature, and they take a moist heat from Christmas onwards as kindly as any greenhouse plant we know of.

WINDOW GARDENING.

BY JOHN R. MOLLISON.

(Continued from page 208.)

FERNS FOR WINDOW GARDENERS.



WINDOW gardener can hardly say his selection of plants is complete without an addition of choice ferns and mosses, either in pots or in a Wardian case, or under a bell-glass; and they are always a necessity for a choice rockery. Their feathery growth, graceful habit, and easy cultivation render them general favourites, worthy of your attention, and pleasing ornaments in a stair-landing window, or a window where flowering plants do not succeed for want of sunlight.

To grow a few select ferns and mosses, in a closed or Wardian case, in such a position, or in the favoured precincts of your sitting-room, is a very pleasant pastime; and more so when, as in the Warrington case, you have a fernery and aquarium combined.

The common wild British Ferns and their varieties being the most adaptable and easiest obtained, will be the ferns we will take principally under our notice, although to be sure there are several greenhouse ferns admirably suited for the same purpose. I will specify them in another paper.

The natural haunt of the fern tribe is in the leafy solitudes of the forest, on the free open breadth of heath and common, among the rocks by the sound of falling waters and crystal streams, and in the fields, hedgerows, and shady lanes of the healthy open country. There the merry skylark cleaves the air with fluttering wings, pouring forth his flood of melody, and the woods and copses echo with the thrush and blackbird's notes, while the golden sunshine fills the air with the hum of insect life. When the long happy summer days come round, and every thing is gay, then is the time for taking a holiday and going fern-hunting in the country; and to enable you to know at once the best ferns to gather for your purpose, I will select the most suitable, and describe their several distinctive characteristics as plainly as I possibly can. In the country you will discover plenty of ferns nearly everywhere you go; the most common being the male fern, *Lastrea Filix-mas*, the triangular buckler fern, *Lastrea acmula*, the mountain buckler fern, *Lastrea montana*, and the lady-fern, *Athyrium Filix-femina*. But these have such a strong robust habit of growth that they are unsuitable for window cultivation, unless during the first year or two of their existence. The dwarf-growing kinds are the most suitable for the confined space in your window or miniature greenhouse. However, the larger-growing ferns may suit those of my readers who have a rockery, or small conservatory, so for their sake I will enter them in our list. When collecting ferns in the lanes and heathy commons, take care to lift them with good roots, and wrap them up from the warm air and sunshine. When you get them home stand their roots over night in water to freshen them up before you pot them.

Give them always good drainage, and soil composed of equal parts of peat-earth, loam, leaf-mould, and silver sand, with a few small lumps of sand or broken brick amongst the soil, which helps to keep it open, giving the water a better chance of percolating freely away, and thus giving the soil less chance of becoming sodden or sour. After potting, stand them in the shade for two days or so till they recover their wonted freshness. We will notice the most suitable ferns first; the large-growing kinds we will notice briefly afterwards.

Asplenium viride, or green spleenwort, is an elegant little ever-green tufted fern, the fronds varying from two to eight inches in length, supported on short dark-coloured stems or stipes, the rachis or midrib entirely green throughout. The pinnae, or divisions of the frond, are very small, and ranged nearly opposite to each other, attached to the rachis by little stalks of their own. The pinnae being distant from each other, and gradually lessening towards the point, give the fronds a narrow, elegant appearance.

It is a pretty little fern for pot culture or the shady moist parts of rockwork. It requires good drainage and protection from the hot summer sun.

Asplenium trichomanes, or the common maidenhair spleenwort, is very like *A. viride*, and often mistaken for it. It is easily distinguished from *A. viride*, however, by the fronds having purplish-black stipes or stems and rachis instead of green; the pinnæ of the fronds being of a deeper green, rounder in form, and placed with greater regularity along the rachis or midrib. It is evergreen, the fronds reaching nearly one foot in length when found in damp, favourable situations, but generally from three to six inches. It is very common, growing on old walls, bridges, rocks and ruins.

It is very easily grown when once established, making itself at home in either pot or rockwork. The upper or drier parts of rockwork suit it best.

Asplenium marinum, or sea spleenwort, is a very thinly-located fern, found only on the south-western coasts of Great Britain and the Channel Islands. It is too tender to stand exposure in the open air any further north. It is a maritime fern, evergreen, of tufted growth. The fronds are generally from six to ten inches long, of a leathery texture, supported by rather short dark brown stipes or stems. The pinnæ, or divisions of the fronds, are placed alternately on each side of the rachis, and are either scalloped or cut round the margin, the whole frond having a lanceolate or lance-shaped appearance, and darkish-green coloured.

They make handsome specimens when grown in a moist, warm atmosphere, such as in a Wardian case in a warm room. They also do well in pots in a window, if the room is warm, and plenty of moisture given overhead, and protection from the sun's warm rays.

Asplenium adiantum-nigrum, or the black maidenhair spleenwort, is an evergreen fern, met with in most parts of the country. It is of tufted growth, the fronds ranging from two inches to a foot in length, according as it is situated on walls, grassy banks, or shady hedgerows. The fronds are supported by shining purplish-dark stipes or stems. The pinnæ are divided and subdivided, the lower pair always being larger than the upper, giving a triangular shape to the frond, which is of a dark green, and leathery in texture. It is a very pretty and serviceable fern, making itself quite at home in the shady parts of rockwork, and is easily grown in pots. The variety *acutum* is a rare and rather tender fern, but makes a beautiful pot plant, nearly triangular in the form of the fronds, and much more robust and graceful in outline.

Allosorus crispus, the mountain parsley fern, or rock brakes, is a well-known, pretty little fern, of an elegant parsley-looking habit of growth. It is a general favourite. The fronds, which vary from two to six inches in height, are of a delicate light green, and a little triangular in shape, supported on slender smooth green stipes about the length of the frond. Its fronds appear in spring and die down in autumn, and are of two kinds, barren and seed-bearing, both much divided—the barren fronds having wedge-shaped segments, and the fertile fronds having oblong roundish segments, which are the highest of the two, causing a noticeable distinction between them. It is an excellent pot fern, and very suitable for rockwork.

Adiantum capillus veneris, or the common maidenhair fern. This

is the only species of the true maidenhair fern belonging to Great Britain, and is very rare. It is a pretty, graceful evergreen fern, with delicate, rather drooping fronds from six inches to a foot in height. The stipes and rachis of the fronds are black and shining; the fronds themselves of an irregular ovate form, much divided, rising from a short creeping stem clothed with small black scales. The entire plant has a delicate feathery appearance, from the much divided state of the fronds. The ultimate pinnae or leaflets are small, roundish, or wedge-shaped, of a thin, delicate texture, and pretty pea-green colour.

This is a lovely fern for the miniature greenhouse or a Wardian case, and a favourite with every one. It requires shelter, being too tender to stand outside or exposed.

Blechnum spicant, or common hard fern, is a very common one, occurring in almost all situations, very plentiful on heaths and commons, but flourishing best in damp woods. It well deserves the name of common hard fern, being of a hard, rigid texture. It is one of the prettiest and most distinct of wild ferns, having, like the preceding, both barren and fertile fronds. The fertile fronds rise straight from the centre, varying from six inches to two feet in length, supported on thinly-scaled dark brown stipes, towering rigidly above the barren fronds, which cluster around them with a drooping, rigid gracefulness, supported by short dark-coloured stipes. The fronds are narrow and lance-shaped, the barren ones being broader and about half the length of the fertile ones, and both divided to the midrib, having a comb-like appearance. The entire plant has a peculiar graceful foliage.

It is a very suitable fern for rockwork, growing freely without much trouble, and does very well in pots.

Ceterach officinarum, or scaly spleenwort, is a very pretty diminutive fern found in the crevices of old walls, growing in tufts. The fronds are from two inches to six inches in length, and are of a deep green on the surface, and covered with a profusion of brown rust-coloured scales on the under side, contrasting prettily with the deep green of the upper side, especially when the under side of the young fronds are exposed to view. The fronds are lanceolate in form, and divided into blunt roundish lobes. It is very difficult to establish this fern when under cultivation. It should be potted high, and kept rather dry and cool.

Cystopteris fragilis, or the brittle bladder fern, is a very graceful fern, of a tufted spreading habit of growth, not evergreen, the frond appearing in spring and dying down in autumn. It tends to form itself into several small crowns from which the fronds rise, varying from six inches to a foot in length, supported by very brittle stipes or stems of a shining greenish colour. They are lance-shaped and much divided; the divisions, placed separately in pairs along the rachis or midrib, are of a lanceolate pointed form, much divided, serrated, and lobed round the margins. The entire plant is of a graceful habit and a pleasing green colour.

It is a common fern in some districts, preferring moist rocky situations, and is quite a gem for pot culture or rockwork, and of very easy management.

The variety *Dickieana* is a lovely little fern of a much dwarfer habit than the usual form of the species, varying only from three to six inches in height, and lanceolate in form. The pinnae or divisions are lanceolate and so close and deflexed that they overlap each other. It is a very pretty little fern, constant under cultivation, and of a pleasing dark green colour.

There is another variety, *dentata*, midway between the two foregoing kinds, its fronds averaging from six to eight inches in height. It is a very desirable variety.

Cystopteris regia, or Alpine bladder fern, is another pretty little fern of an elegant tufted diminutive growth. Its fronds appear in spring and die down in autumn, and are from four to eight inches in height, of a bright green colour, supported on short smooth stipes, scaly at the base, and rising from a crown. They are lanceolate, and divided; the divisions, nearly opposite each other, are much divided and subdivided, giving the entire fern a very elegant appearance. It is rather tender in constitution.

This fern is quite a gem for pots or a sheltered rockery.

Polypodium vulgare, or common polypody, is a very common fern, growing almost everywhere over old walls, ditch banks, and trunks of trees. No dweller in the country can miss seeing it by the wayside. It is an evergreen fern with a creeping stem about as thick as a pencil, thickly covered with brownish pointed scales. It creeps along by means of this stem, throwing up from the upper side its deeply cut lance-shaped fronds, about six or eight inches in length, of a darkish green colour and rigid habit.

It is an excellent fern for rockwork and does very well in pots.

The Welsh polypody, or *Polypodium Cambricum*, is a remarkable variety of the above, having the lobes of the fronds broader and irregularly lobed a second time into sharply toothed lobes.

It is a pretty fern either for pots or rockeries.

Polypodium phegopteris, or beach fern, differs considerably in habit and form from the last. It is not evergreen, the fronds appearing in spring and dying away in autumn. It has a slender creeping stem, slightly scaly, from which the fronds are thrown up, supported by very long fleshy brittle stipes. The fronds are from six inches to a foot in height, triangular in form, rather hairy, and of a delicately pale green colour, divided, the lower divisions opposite and lanceolate in form, and deeply lobed or divided again. The lowest pair of pinnae are much smaller than the pair above, and reflex backwards in a peculiar manner, which is a very distinct feature of this species.

It is a good fern for a Wardian case or for pot culture, requiring plenty of water and good drainage.

Polypodium dryopteris, or oak fern, is a lovely little slender pea-green fern, appearing in spring and dying down in autumn. It has a slender creeping stem from which the fronds rise, supported on brittle dark coloured stipes, much longer than the fronds, which vary from four to eight inches in height, and are triangular in shape, each frond being divided into three nearly equal parts, each part triangular divided and subdivided. No other polypody has the fronds so equally divided. It often forms into dense tufts and is quite a gem.

A first-rate fern for a Wardian case or for pot culture, and does well on the shady parts of rockwork, and a general favourite.

Scolopendrium vulgare, or the hart's tongue fern, is very common on old walls, hedge-banks, rocks and river-sides. It is an evergreen fern of tufted growth, the fronds being simple or undivided, of a beautiful bright green colour, and stout leathery texture, varying from six inches to a foot in length, supported on rough scaly brown stipes or stems. The fronds are slightly waved at the margin, strap-shaped, forming a circular drooping tuft, elegant of outline, contrasting very distinctly with the usual feathery appearance of ferns, and is a general favourite.

In shady moist situations it forms beautiful specimens. It is one of the very best ferns for open rockwork, and makes a beautiful pot plant for the window.

Some of the varieties of this fern are very beautiful and curious. *Crispum* has the margins of the fronds greatly developed, giving them a rich wavy crisped appearance. There are numerous other varieties, such as *polyschides*, *multifidum*, *laceratum*, and *ramo-marginatum*, all worthy your attention and very suitable.

Trichomanes radicans, or European bristle fern, is a very lovely and elegant little plant of a delicate half transparent texture, found only upon dripping rocks in the immediate neighbourhood of waterfalls. It has a scaly wirelike creeping stem, nearly black in colour, from which the fronds rise supported by dark-looking stripes, having a thin pellucid texture or continuation of the leafy parts embracing them continued along the rachis or midrib. The fronds are three or four times divided, and cut again into small-lobed segments of a delicately thin semi-membranous texture.

It is only found in Ireland, where it creeps and grows most luxuriantly among the rocks where constant moisture is maintained. In cultivation the same moist atmosphere must be kept up. It can only be grown therefore by being kept close in a Wardian case, or under a bell-glass, and often watered overhead. It shrivels up if it gets dry or exposed to the sun. Its transparent loveliness has made it a great favourite with cultivators.

Woodsea ilvensis, or Alpine woodsia, is a tufted diminutive species, and very rare; found in the crevices of moistened rocks in high mountainous regions. Its fronds, which appear in the spring and die down in autumn, rise from a crown, and are longish and narrow, divided into several lobed divisions or pinnæ, placed alternately along the midrib. This is an excellent little fern for a case, and does well along with filmy ferns.

Asplenium ruta-muraria, or the wall rue, is a very diminutive tufted-growing fern, found abundantly, in some localities, on old walls and bridges. It has hard wiry roots that insinuate themselves into the crevices of masonry, and are difficult to remove. The fronds rise in a tuft from the root, and are dark green and hard, very like the leaves of the garden rue in shape. It is a nice little fern for small rockwork in fern cases, and is very easily cultivated. It is also very suitable for outdoor rockwork when once established. It is an evergreen fern.

THE ENEMIES AND FRIENDS OF THE ROSE.



HE "consuming canker" that secretly hollows out the plump red buds, and leaves it as a shell to wither on the tree, may be regarded as the leader of a host of harpies that wage war against the welfare of the rose. The amateur will soon become familiar with them all, and happy will he be if they disturb not his rest, nor press upon him the cruel suggestion that rose growing is accompanied with greater plague than profit. The "grub," the "fly," the "mildew" are the captains of the army of enemies, and they lead a formidable host that have for allies the east wind, the summer drought, the winter frost, and the blundering human hand that will do wrong, and generally errs most gravely by attempting too much. In respect of the principal insect enemies of the rose, a golden rule may be offered for the comfort of the anxious amateur. *Ignore them!* Do full justice to the trees in respect of soil, planting, watering, etc., etc., and you will be but rarely troubled by these plagues, for they seek out first the starving roses; they want the trees that have been badly used; they swarm to the garden of the sluggard, where the "thorn and the thistle grow broader and higher;" and, generally speaking, are to be regarded as proofs that the trees are not thriving, and need some amendment at the root.

APHIS, OR GREEN-FLY, is the most frequent and destructive enemy of the rose. Although to prevent this plague is too often a sheer impossibility, it is nevertheless true, that trees in full vigour of growth with abundant healthy leafage, are not so soon or so destructively attacked as those that are insufficiently nourished, or have sustained some serious check. It cannot be doubted, that many of the destructive visitations of "fly and grub" on roses, "American blight" on apple-trees, and "black-fly" on the young shoots of plum and cherry, are prepared for by the frosts that usually come in the middle of May, when the sap is flowing freely, and development of leaf and wood is in full activity. The sudden check occasioned by unseasonable cold corrupts the juices, and renders them more palatable to the insects than the juices of an unchecked healthy tree would be, while, concurrently with the destruction that rapidly ensues on the settlement and multiplication of the insects, the growth of the tree is arrested, and it cannot quickly outgrow the destruction as a healthy tree will do, if we remove some portion of its leaves, or even cut off a considerable number of its branches. Therefore, we may properly begin to advise, that to prevent the spread of aphid, the trees should be by every possible means encouraged to grow vigorously. Late pruning and shelter afford protection from the May frosts that are the precursors of "blight" in the rose garden and the orchard, and liberal manuring and watering will carry the trees through many a trial with little harm, when, by the proper advance of the season, they are capable of appropriating considerable supplies of sustenance. There is considerable injury done to roses by endeavours to forestall

their proper season. We may force the growth by various means; but a sharp frost on the 20th of May (or thereabouts), may be expected four years in ten, and when it occurs, all the previous new growth of the outdoor roses is destroyed, and the plants are also very seriously injured in general health. Hence, it is not prudent, as a rule, to begin to give water copiously and regularly, until the dangerous date is past; but from the 20th of May to the 20th of July, water should be given without stint, to insure a fine bloom and a free growth, and make the fly afraid to touch them. On soils of a particularly dry nature, the rose beds should be somewhat below the level, and enclosed, if possible, by broad margins of turf cut from clay land, so as to prevent hasty departure of water, and economize every drop of the rainfall.

But the green-fly will sometimes come in spite of these preventives. Now, good rosarian, take your choice of a thousand remedies that you can obtain, like patent medicines, at 13½d. per box or 2s. 9d. per bottle, or at a price per hogshead or ton, by inquiring of the manufacturers. It is with pleasure we confess that we have tried all the plant-cleansing preparations that have been advertised during the past thirty years, and found them equal to the professions of their promoters. Therefore, the novice who buys a preparation described as an infallible destroyer of green-fly on roses, is likely enough to secure all he wants, and may at least give it a fair trial without trembling for the result. Having, in the capacity of advisers, to make choice amongst them, particular attention is now directed to three distinct preparations. *Fowler's Insecticide*, the *Aphis Wash* of the City Soap Company, and *Pooley's Tobacco Powder*, are the cheapest, safest, most potent, most cleanly, and most convenient, of the many preparations we have fairly tried for the eradication of fly from roses. As to the mode of applying them, the best advice we can give is to follow the printed directions; but when you are told to dilute the preparations with water, take care to use *soft water as hot as the hand will bear*. This mode of procedure we have determined to be the best by repeated experiments, and many careful observations. The tobacco powder is the most simple remedy of all. It must be dredged on from a pepper-box or flour-dredger, covered with coarse muslin, when the trees are wet with dew, or when they have been wetted for the purpose with the garden engine. In any case of waging war against fly, the operator must bear in mind that they usually locate themselves on the tenderest part of the young shoots, and the *undersides* of the young leaves. On such parts apply the remedy with engine, syringe, or dredger; and as the preparation used costs money, catch as much of the waste as you can, and where the shoots are pliable and manageable, draw them down and dip them in your can of hot mixture, keeping them in it a few seconds, and the waste will be reduced to a minimum.

The immense value of pure water as an insecticide remains to be remarked upon. At present, very few cultivators believe in it; but the day will come when reason will prevail, and the preparations of the shops will be less sought after than the water engine and the

pump. The regular and vigorous employment of the water engine amongst roses, will render lodgment of fly next to impossible. If the plague is confined to a few plants or a few shoots, the hand syringe may be sufficient to discharge a killing shower, and scatter the enemy to the devouring elements. But a terrific periodical drenching, aimed as much as possible at the undersides of the leaves, is the finest of all cures for a plague of aphis, because, while it sends the fly to Jericho, or some other Ultima Thule, it refreshes the trees, heightens their vigour, and cleanses their breathing cuticles of the injurious deposits of the vermin, for it must be remembered that while the fly sucks the vital juices of the plant, it spreads a gummy exudation on the tender parts it banquets on, and thus while bleeding suffocates, and is therefore more than a vampire.

In the choice of water, hot water is better than cold, and if any doubt as to what we mean by the term "hot," say 150° Fahr., which is as hot as the hand can bear without pain. As hot water is better than cold, so soft water is better than hard, and diluted sewage best of all. Sewage is, in fact, a grand vermin killer, and if largely diluted, does no harm to the most delicate green leaf, while every drop that trickles to the roots, affords nourishment to strengthen the tree against its insect plagues.

The best house-made preparations that we can advise upon are two in number. We shall give first place, because of its complexity, to a decoction of quassia chips. To every gallon of water required, measure out five ounces of quassia chips, and put the chips into the cold water. An hour afterwards, add to every gallon five ounces of soft soap, previously dissolved and well beaten up in a little hot water. Apply with a soft brush, taking care to brush *upwards*, and half an hour afterwards wash off the mixture and the dead vermin with hot water by means of a syringe. We have tried this preparation on several occasions, and obtained the most conflicting results; on one occasion it was almost useless, on the next it was a "perfect cure." The difference, doubtless, is to be found in the difference of quality of the quassia chips. At all events, there are two kinds in the market—the Surinam, which is the produce of *Quasia amara*, and the Jamaica, obtained from *Picræna excelsa*. The strongest bitter and most destructive to the lower forms of animal life, is the last named. All the gardening books recommend the employment of hot water in preparing infusions of quassia, and they are all wrong, for heat dissipates its killing properties, and extracts the pure bitter only.

Now, we come to a cheaper remedy, which you will be puzzled with at first, but heartily believe in at last, if you are earnest in your business. A solution of mud—call it *de l'eau trouble*, or mud-water—as thick or as thin as you can conveniently use (not in a syringe, certainly, unless you can afford to buy a new syringe at every operation, but) to apply with some sort of mop or big brush to the undersides of the leaves, and those parts of the young stems on which the fly has, to use the gardener's language, "got a good holt." You need not wash it off unless it is convenient and agreeable to do so, for by contraction or expansion, as subsequent

weather may determine, the muck will soon disappear, but you can do no harm by washing it off in the course of a few hours after the application. Pardon our prolixity, for the sake of the weaker brethren, when we say that it is as easy to suffocate as to poison aphids, and mud will effectuate the first as easily as tobacco will the second, and of the two mud is the cheapest!

But have we nothing to say about the potency of tobacco smoke? Ah, it is a fine subject! When roses under glass are much troubled with fly, smoke is a grand settler. But although the books say that by making a canvas or blanket tent to cover a rose tree, you may easily employ fumigation out of doors, we say that to do so is waste of labour, and tobacco, and tent, and time, for however perfect your means of imprisoning the smoke, the absorptive powers of the atmosphere will beat you; and why, because you love roses, should you be required to pay a guinea for every green-fly you can kill by means of tobacco smoke out of doors? Dear friends, give it up. In the rose-house you may fumigate with tobacco, and save your roses; but in the open ground there is only one thing likely to happen by adopting the smoke process, and that is, that you will waste the tobacco, and contribute, most unjustly to yourself, to the aggregate of our extravagant national revenue. Water and mud cost nothing; try these cheap and handy remedies first, and when they fail take something stronger.

On the subject of fumigating the rose-house, we must be sufficiently specific to put the inexperienced amateur in the right way. The best fumigator is one with a revolving fan or a revolving cage, containing the tobacco, by means of which the smoke is blown out in a rapid, dense, killing cloud; but an effectual instrument may be extemporized by knocking a hole in the side of a large flower-pot, and then, having put some hot cinders and damp tobacco into it, the nozzle of a bellows is placed against the hole, and ignition promoted by gentle puffing. Mr. Gidney, of East Dereham, Norfolk, some years ago brought out an excellent fumigator, consisting of a tin cylinder and a spirit lamp, the latter being employed to keep the tobacco burning, and the fumes being allowed to spread without help or interference until lamp and tobacco ceased to burn through exhaustion of materials. In any case, as already remarked, the strongest shag tobacco is the best possible material for fumigating. In respect of burning it, the best way is to insure a good brisk ignition to begin with, but to take care that the tobacco does not break out into a flame, for that is at once wasteful of the tobacco and destructive to the plants. The usual time for fumigating is the evening, and preparatory to the operation the plants should be dry, and wet mats should be laid over the ventilators, and wherever else there may be crevices through which the smoke might escape. Early the next morning the syringe should be used freely, both to refresh the plants and cleanse from the dead vermin. In the course of a few days the operation should be repeated, for it rarely happens that one smoking is enough to settle a serious attack of fly.

Amongst the many patent fumigators, we give the preference to Drechsler's as the most effective in operation, and the most service-

able in make and material. It consists of a large iron cylinder, fixed upon four legs, with a large spout for the egress of the smoke. The inside is fitted up with a stout wire basket to hold the fumigating material, and is made to revolve for the purpose of creating a current of air by means of bevel gear set in motion from the handle outside. In the bottom of the cylinder there is a large

opening to admit air, and also to allow the ashes to escape; therefore any clogging by means of the ashes is impossible. In setting it to work, twist a piece of dry brown paper, and, after it is lighted, place it in the cage, and then fill with the tobacco or whatever else may be used. The material, put immediately over the burning paper, should be rather dry, to insure its igniting quickly; but the remaining portion must be used rather moister than with the flower-pot and bellows.

The handle should be turned gently during the time the cage is being filled, and when a sufficient quantity of material is put in close the



lid, and by continuing to turn the handle steadily, dense volumes of cool smoke will be emitted, which will fill a large house in a few minutes. It is not necessary to go inside the house at all, as a half brick can be removed from the wall, and the end of the spout inserted in the opening. The occupants of the houses will be fumigated quite as effectually as they would be if the operator and machine were inside, an advantage which cannot be over-estimated, as being in a house filled with tobacco smoke for a quarter of an hour or more is certainly one of the most disagreeable experiences connected with the management of the garden.

Tobacco water is sometimes to be preferred, especially if only a few amongst many trees are infested with green-fly. To prepare it procure the strongest shag tobacco, and pour boiling water on it at the rate of one gallon of water to two ounces of tobacco. When cold and clear, apply with the syringe or dip the shoots into it.

MILDEW is, without question, an evidence of debility, but it may be the accident of the season, and not the fault of the cultivator. This plague usually follows close upon a time of drought or of excessively hot days, followed by excessively cold nights, with a clear east wind and a sky wonderfully blue. The plant is debilitated by sudden, and extreme, and oft-repeated changes of temperature, and mildew is the result. Here again, whatever restores the vigour of the plant makes an end of the mildew; but, as a matter of fact,

when mildew has really obtained what gardeners call "a firm holt," it continues to the end of the season as a chronic disease. The "aphis wash" is the best of nostrums for this affection, for it is highly charged with sulphur, and appears to nourish as well as cleanse the trees. We have recommended it to be used with hot water to eradicate fly; now we shall advise that it be used with hot water and clay, or liquid mud, to prove a destroyer of mildew. Dry flour of sulphur dusted, as recommended for the application of tobacco powder, is at once the simplest, and, as a rule, the surest remedy, provided it is applied with care, to cover all the affected parts of leaves and bark while they are moist, and will hold the powder. Strange to say, dry dust, very dry dust, very fine dust, but dust alone, *pure et simple*, is a grand medicine for mildew if powdered on freely when the affected parts are damp, and in the interest of the operator (who may not desire to sneeze his head off), it should be applied on the windward side of the trees. An important matter for rosarians who are much troubled with mildew is to eradicate the sorts on which it makes its first appearance, for these serve as nurseries to propagate the vile fungus for the destruction of the rose garden. Generally speaking, Geant des Batailles will be found the first and greatest offender, and after him, perhaps, Lord Clyde and Lord Raglan. Burn these root and branch. Better fifty sorts and no plagues of Egypt, than five thousand and a broken heart!

GRUB is a collective term. It comprises "leaf rollers," "leaf miners," "canker," the "worm i' the bud," the "saw fly," the "Bedeguar" or cynips, the "leaf cutter," and a host of other comparatively high-class insect depredators. If we could give directions for preventing or eradicating every one of these plagues we should be delighted, but in truth we can only, in a most general way, recommend hand-picking and leaf-pinching.

As a matter of fact, these enemies of the rose rarely commit any serious mischief, and when they eat to the core only a few amongst many buds, they really do good by effecting a judicious thinning, which the amateur might not have the courage to perform. Be not troubled about them, dear friend, but encourage the flycatchers and other small birds, for they are active, hungry people, and have the most direct interest possible in keeping down the visible insects that ravage your rose garden. A shower of hot sewage now and then, and a dusting with tobacco powder, will render the roses unpalatable to these marauders, and by diligently hunting with the aid of a sharp eye and a quick hand, you will surely manage to mock these vagabonds, whose aim it is to rob you of your roses and your peace.

The little friends of the rose are by no means few in number, and should have brief mention here. The common sparrow is one of the most active and assiduous, for if left alone sparrows will banquet on green-fly, and pick, pick, pick for leaf-rollers and nibblers, and excavators of all sorts. If you find your roses are becoming dreadfully clothed with aphis, and you really have no time to pult or poison them, you may adopt an efficacious method of enlisting the sparrows in your service. Two or three times a day, sprinkle a

handful of grain or bread crumbs amongst the roses. The sparrows will soon appreciate your bounty, and having cleared the ground, will next proceed to clear the trees, taking the best care possible to repay your kindness. To render this plan a perfect success, you should keep the sparrows always on the look out, and never supplied very bountifully; so, as far as possible, institute frequent sprinklings of infinitesimal bounties.

Make yourself acquainted with the larvæ of the ladybird, or *coccinella*, for these are greedy devourers of aphids, and touch no vegetable food whatever. The larvæ of the *syrrhidæ*, again, are indefatigable destroyers of the same pest. Still more destructive to aphids than either of the foregoing are the larvæ of the lace-winged fly, *chrysopa perla*, a sort of ephemera, with golden eyes and green wings. This fly lays its eggs in a manner which causes them to appear like minute fungi, for every egg is on a transparent stalk, the latter being a kind of gluten deposited with the egg, and drawn out by the parent to elevate the egg out of the reach of danger. These stalked eggs may often be seen like microscopic fans fixed on the edges of rose leaves, and on the youngest shoots of the lilac. The ichneumon fly, *Opnion luteum*, is another friend of the rosarian, for its larvæ feed on caterpillars, and the more of them we can find amongst the roses the better.

THE FORMATION OF A HORTUS SICCUS.



O save individual replies to the many communications from our readers, asking for further information as to the forming of an herbarium, we now make some general observations which we trust will prove satisfactory to our inquiring friends.

First, as to the size of the specimens. Each should have *at least* two open blossoms, and a few buds; the quantity of foliage must be regulated by the habit of the plant. In some cases it is necessary to exhibit the radical leaves, and even the root. This should always be done in creeping plants, as the buck-bean (*Menyanthes trifoliata*), and in some others, as *Campanula rotundifolia*, which has received its specific name from the form of its radical leaves. Coloured blotting-paper must be used to dry the plants in, as the acid employed to bleach the white injures the colour of the flowers.

Take your specimen, and having laid it in its natural form upon the blotting-paper, proceed to lay out the parts, beginning at the top of the plant. Penny pieces or halfpence are the most convenient assistants in this operation, as they occupy so little room. Lay some of the leaves with the upper side to the view, some so as to show the under side, and the same as to the flowers. Be careful not to destroy the character of the plant, when laying it out, by distorting the stalks; although neatly placed, the original manner

of growth may be preserved. Upon the specimens lay two leaves of blotting-paper, and upon them a plate of zinc, which should be slightly warmed. Our plates of zinc are the size of a quarter of a sheet of blotting-paper, and cost threepence each. Zinc is preferable to tin, as being thicker and cheaper. Proceed in this manner with as many specimens as your sheets of zinc will allow; then, placing a sheet of the metal under the pile, load it with weights, or apply any other pressure that may be convenient; the common screw press used for table linen is very effectual. Let the plants remain thus for a fortnight or three weeks, at the end of which time most of them will be sufficiently dried and pressed. Bog and water plants require even a longer time.

Next, as to the size of the paper upon which the specimens are to be fastened. The very large paper gives room for splendid specimens, but, unless they be crowded together, it is rather extravagant; and upon the whole we prefer the foolscap size—it is easy, even with the grasses, so to arrange the specimens as to exhibit each part to advantage. We have classed our plants according to the Linnæan system, adding the Jussieuan order to the name of each plant; we would therefore recommend that the name and number of the Linnæan class be written on the head of each page. Having carefully taken your plants out of the blotting-paper, lay each upon the page where it is to remain, and with a little gum fasten the tips of the leaves, the end of the stalk or roots, and such parts of the flowers as may require it, to the paper. We strongly recommend gum tragacanth for this operation; it is more expensive than gum acacia, but it is neater, stronger, and less troublesome to prepare. Care must be taken not to dissolve too much at one time, as, when not occasionally warmed, it becomes mouldy. It should never be boiled, but dissolved gradually in an earthen or a glass jar.

Having gummed the specimens to the paper, it remains to affix the names, which ought to be done thus, upon a slip of paper to be placed across the lower part of the stalk:—

Parnassiæ palustris.
 Grass of Parnassus.
 Order 4. Linn.
 Nat. Ord. Hypericineæ.
 Where gathered.
 Day of the month.

Thus the habitat and the time of the year at which the plant flowers are easily remembered or referred to.

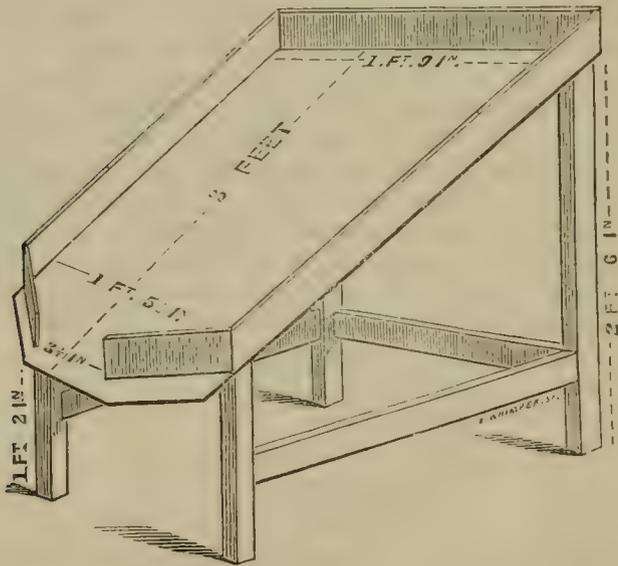
It is necessary to dry the blotting-paper thoroughly after it has been used, both in the air and by the fire; if the least dampness remains in it, the next specimens for which it is used will become mouldy. The zinc also should be wiped and well dried, and if the same can be done about once in a week while the plants are drying, without disturbing their arrangement, the process will be expedited. Of course the plants must be placed upon the writing-paper, on one side of the leaf only. We assure most of our young readers who are inclined to follow our example in forming a *Hortus Siccus* of

English plants, that they will find it an extremely interesting amusement, and however limited may be their opportunities of gathering specimens, it is well worth while to make the attempt. Young persons are always prone to form collections, and surely flowers are more instructive and more interesting than the baubles which generally fill a young lady's cabinet.

A DRENCHING BOARD FOR CLEANSING PLANTS.



IN using tobacco liquor, Gishurst compound, and other vermin killers, there is usually a great waste, and, what is perhaps worse than waste, the stuff gets into the soil, and perhaps does as much harm to the plant at the root as the cleansing may have done good overhead. Dipping the plant head downwards cannot always be practised, and it is a slow process; the syringe often splashes the stuff where it is not wanted, and in any case is wasteful. We were lately shown a contrivance in wood, invented by a gentleman who has found Gishurst



compound an effectual vermin killer, and it struck us that a figure of it would enable any of our readers either to construct it, or to get it constructed at a very small cost. As may be seen by the figure, it is merely a sloping board of half-inch deal, broader at the top than bottom, with sides five inches high, turned at the front so as to catch the rim of a pot laid on the slope, the front being open for the flow of the waste into a pail. The board is mounted on legs, and the dimensions are given in the cut. By placing a pail under the front, and laying the plant on its side, the foliage may be syringed

without one drop of liquor getting to the roots, and what the pail contains may be used again and again. It might also be useful in tying out specimen plants, where considerable lateral growth may require regulating underneath, the pot being laid on its side, resting against what we may call the lips of the top frame, with the head of the plant entirely free. The cost of the one sketched was only seven shillings, and was made by a carpenter, but we think the sketch and description here given will enable any amateur with at all a practical turn to manufacture his own.

THE VERBENA.



THE Verbena has been steadily declining in popularity during many years past, in consequence of the disfigurement of gardens by its frequent failures, and in few instances does it prove equal to the demands and expectations of the cultivator. Yet there is no bedding plant that more perfectly answers the requirements of the garden colourist. Its trailing habit, forming a close carpet of vegetation, its well sustained umbels of brilliantly-coloured flowers glittering above the suitable ground-work of dark green leaves, and the continuousness of its intensity of colour, are qualities that should insure it a place in any select list of first-class bedding plants. In exceptionally hot seasons, verbenas unhappily situated shrink away to dust ere the season is half gone, but as a rule failures with the verbena result from bad cultivation, and especially from the careless system of planting bedders in badly prepared soil, without any special preparation for them. The verbena will only thrive in a satisfactory manner in a good deep holding loam, but a light soil may be made to suit the plant, provided a liberal dressing of manure is dug in during the winter, and a fair average season follows, with alternations of showers and sunshine; but with the best preparation success cannot be depended on, in a peculiarly hot and dry season, on light sandy soils. It is therefore advisable to adopt a very liberal system of cultivation, and as we do not often experience a tropical summer, success under such a system may fairly be expected, although the plants may have a lighter soil than they would prefer. In the case of a hot soil, a mulch—that is, a surfacing of half-rotten manure, put on at the time of planting—will do wonders, and as to its appearance, the plants will so soon spread over it and hide it, that it is practically of no consequence. In a droughty summer a few heavy soakings with soft water will also act beneficially; but it is best to avoid watering if there is a prospect of rain before the plants begin to suffer, and, in any case, frequent surface dribblings do more harm than good. It is not a matter of great importance to plant verbenas in the full sun, but a heavily shaded position will not suit them. A free current of air, and a few hours of sunshine per diem they must have, but they

August.

cannot so well endure continuous roasting as geraniums and petunias, which really rejoice in sunshine. A very common cause of failure is the practice of putting out plants that have been starving in small pots several months previous to the planting season. It is a grievous mistake to propagate the stock for bedding early in the season, although it is generally supposed that early propagation is necessary to secure strong healthy plants by planting time. When struck early, and necessarily kept starving in pots for several months, the constitution becomes impaired so much that they are unable to resist, with any degree of success, the attacks of red spider, thrips and mildew, three most formidable enemies they have to contend with. The month of April is quite early enough for striking verbenas intended for bedding purposes. The tops of the healthy shoots should be taken off at the early part of the month, struck in a brisk bottom-heat, and potted into store pots, and carefully hardened off; these planted out as early in May as the weather will permit will grow away freely, and the beds in which they are planted will soon become a blaze of colour. The compost in which they are potted should be rich and nourishing, and for that reason nothing suits them better than a mixture of good turfy loam and decayed hot-bed manure mixed together at the rate of two parts of the former to one of the latter, with a sprinkling of sand to keep the compost open.

THE GARDEN GUIDE FOR AUGUST.

THE FLOWER GARDEN.



GOOD stock of bedding plants should be secured at once; of geraniums and fuchsias, ripe hard shoots make the best plants, both for winter keeping and next season's blooming. Strike verbenas and petunias from the points of young shoots; calceolarias should not be struck till next month. Herbaceous plants may also be struck in quantities, to keep over winter in frames, such as pansies, dielytras, double walls, double canterbury bells, double feverfew, and hollyhocks. Sow hardy perennials and biennials for next season's blooming, if not done before, but by this time the plants ought to be fit for planting out, in which case, plant them where they are to remain, to get thoroughly strong. Keep dahlias well fastened, and put stakes to chrysanthemums before their heads get heavy, as a protection against storms. Pompones may still be struck for blooming in pots. Plant out pinks and carnations, in nursery beds, in well-manured loam. Bud roses as the season permits, choosing dull moist weather, when the bark rises freely. Give plenty of water to chrysanthemums, with occasional doses of strong liquid manure. Roses budded last month will probably want the ties loosened, and the best way is to cut the ties at the back, and let the swelling of the bark loosen the bass in its own way. Give plenty of air to auriculas, and repot such as need it in a size larger; but frequent shifts are not desirable.

KITCHEN GARDEN.

Sow the main crop of winter spinach; thin out the rows of parsley, so as to get rid of every plant not well curled; sow saladings, succession lettuce, turnip

radish, cabbage, and turnips. Earth up the earliest rows of celery; earth up leeks, hoe between potatoes to give air to the roots, plant out broccoli, and every kind of winter greens as fast as you get vacant spaces. Sow cauliflower the third week, to keep over winter in frames. The main crop of cabbage for spring use should be sown between the 12th and 20th. Remove decayed leaves from cucumbers and gourds, to prevent the growth of moulds and fungi about them in damp weather, and take cuttings, or sow seed, for cucumbers to fruit during winter.

FRUIT GARDEN.

Where fruit is wanted to be kept hanging, throw a net over the bushes, to keep off the birds, and give a little shade. Put wasp traps about vines and peaches, or stick a few lumps of loaf sugar among the branches, and as long as there is any sugar left they will not touch a single fruit. Nail in all good shoots on wall trees, that they may have the heat of the wall to ripen them. Make beds of strawberries, if not yet done.

GREENHOUSE AND STOVE.

Pelargoniums that have broken freely, should be repotted in as small pots as their roots, after trimming, can be got into. Young stock should be well hardened as soon as possible. Keep cinerarias and primulas growing freely, and make a last sowing of the latter. Sow now, for decorating the house early in the spring, *Clarkia*, *nemophila*, *erysimum*, *ænothera*, *collinsia*, *veronica syriaca*, *mignonette*, etc. Give plenty of air to stove plants, and get a good stock of young pines forward. Vines that have ripened their fruit should be well cleared, and have thorough ventilation. Whatever painting or repairing is required should be attended to forthwith.

TO CORRESPONDENTS.

HELIOTROPES.—*C. H.*—The Heliotrope must be wintered under glass. It is the most tender of all the bedding plants, and will not bear the slightest frost. It may be propagated by cuttings of the young tops in the same way as verbenas. The cuttings are best struck under glasses in a mixture of peat and silver-sand, and should always be kept in a moderately growing state.

DWARF FRUIT-TREES.—*E. B., Devon.*—Procure nursery plants of the sorts you want during the autumn; the pears on quince stock, the apples on the paradise. They should have been worked just above the collar, and not have been disbudded on the main stem. When planted, trim them with a pruning-knife to a regular shape, cutting long shoots back to an outside bud, and entirely clearing away all the ill-placed ones. Next season, as they make their growth, pinch them back—that is as fast as new shoots require a length of a foot or fourteen inches—nip out the point, repeating this occasionally until August; after which pinch no more, but let the wood ripen. The knife ought never to touch them after the first pruning from the nursery, and they should be taken up, and carefully but not severely root-pruned every year. With good soil, good sorts, and good aspect, this plan is sure to prove successful.

WORMS IN POTS.—*Thomas Hill.*—The best way to prevent is to treat the potting stuff previous to planting to a good dose of boiling water. Have the pots ready filled a day before they are used, and water the soil in them well with boiling water. Scald also as much as you will require for filling in. Next day it will be none too moist to work with, and there will not be a living creature in it. A dose of boiling water round the woodwork of the bin will clear away woodlice. It is not advisable to destroy the earthworms in the stuff heaped up in the open

air, they will do more good than harm, as long as it lays together. Earthworms should never be ruthlessly destroyed; they are appointed by nature to ventilate the subsoil, by boring in it channels for the admission of air.

STRAWBERRY PLANTATIONS.—*J. P., Torquay.*—We have known strawberry-plants at ten years old to bear well and grow luxuriantly, but it is the exception. As a rule, strawberry plantations should be renewed every three years, and the best time is as soon as good-rooted runners can be got—that is, during July and August. The ground should be trenched deeply, and a liberal dressing of manure well chopped over and dug in with it.

KALMIA GLAUCA.—*Pensioner.*—*Kalmia glauca* should have a west aspect, a peat soil, the roots to be screened from the soil by its own foliage, or the foliage of other plants of the same constitution, and to have abundance of water overhead while making its spring growth. Without this care it seldom flowers, and with every care it will not flower in some districts.

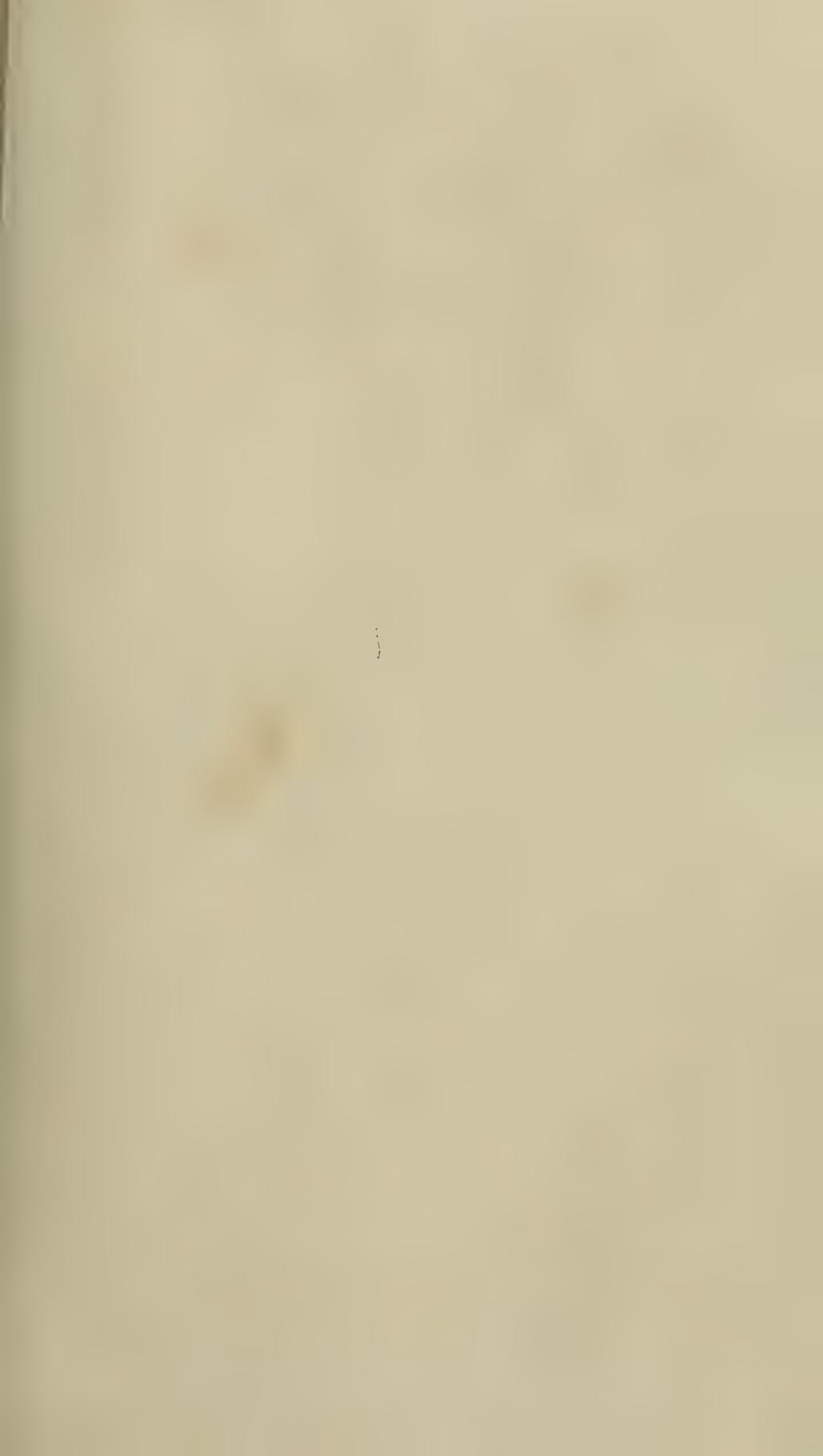
HERBACEOUS PLANTS.—*J. B. Dorking.*—You should sow at once, there is no time to lose. The last week in July is the best time of the whole year for sowing seed of herbaceous plants.

WEIGELIAS.—*M. S. C.*—Leave them alone, give them no attention whatever, except to remove dead wood, and you will have abundance of bloom. Weigelias always flower profusely when old.

LILIES.—*Beta.*—All border lilies that have done blooming should be taken up, the offsets removed, and the large roots for flowering next year be planted again directly where they are to bloom, and with a shovelful of rotten dung or some sound fresh compost added for every clump. Plant the offsets also at once in the reserve ground. This is the proper way to manage all border lilies. Choice liliiums in pots to have abundance of water until done blooming; after that, the supply of water to be diminished, but not hastily; and as soon as the foliage shows signs of decay lay the pots on their sides on a sunny shelf in a greenhouse, to make sure of ripening the bulbs. Let them remain in the pots a month, then shake them out and repot them.

EARLY ANNUALS.—*Beginner.*—If you want a show of annuals early in summer, you must sow them in the previous autumn. During the latter half of August or the first half of September, is the best season to get them strong enough to stand the winter; if sown earlier, they get too forward, and are apt to suffer from frost. An open situation, sheltered from the north, is to be preferred, and the ground should be as hard as flint. On this hard surface lay down a shallow bed of poor sandy soil, and on that sow the sorts in rows pretty close together, each marked with a good-sized tally. In gardens that are very dry or insufficiently drained, the plants will have a better chance, if the bed is made to slope southward. This will carry off excess of moisture, and the plants will start better in spring. They are to be transplanted singly into the beds and borders as desired, as early in March as the weather will permit. The soil in which they are to bloom should be rich and well worked; and as every one of the plants will grow to twice the size ordinarily attained by the same sort when grown in spring, they must be planted at double the ordinary distance apart. To make sure, it would be as well to sow at least one pan of each of the same sort as those sown on the border, these to be kept in a pit or frame, and dealt with in the same manner for blooming. Some of the improved forms of hardy annuals are equal to anything we possess for brilliancy of colour and effect in masses.

CALCEOLARIAS.—*New Subscriber.*—Nothing is easier to propagate than bedding Calceolarias, and the middle of September is quite soon enough for the purpose, as they root freely either in pots or in a cold frame, if kept free from insects, damp and frost, though some weeks must elapse before they are properly rooted.





ANEMONE STELLATA (HORTENSIS.)

ANEMONE STELLATA.



THIS very beautiful species of Anemone was introduced into this country from the south of Europe, in 1597, and is very suitable for beds in the early spring, for the mixed border, or in planting in warm, sunny, well-drained spots on rockwork. The usual time for planting the anemone is September or October; but by planting every month, a succession may be obtained throughout the year. The anemone grows best in a mixture of deep rich loam and sand, and is readily increased by division of the tuberous roots, or by seed. The generic name is derived from *anemos*, the wind, because the greater part of the species grow wild in elevated places much exposed to the wind.

THE MAKING AND THE MANAGEMENT OF THE LAWN.



TO insure the luxury of a "velvet lawn" is, to speak generally, a most easy matter, and, though it may be comparatively costly in the first instance, it will prove in the end one of the best of investments of gold in gardening. The soft, elastic turf of a chalky down will kindly inform the traveller that a lawn may be laid on chalk; and the closely-bitten grassy herbage of a sandy common will in like manner suggest that gravel and sand may be clothed for the production of a living carpet that will last for ever. It is, however, on a deep loam or a clay that has been well tilled that the best example of grass turf is to be looked for, and on such land we should prefer to operate, were it required of us to present the best possible example of making and keeping a garden lawn.

In the formation of a lawn, all levels must be carefully determined, and the ground thoroughly well prepared, that there may be no waste of labour in alterations afterwards. In the case of laying fresh turf on the site of an exhausted plot, from which bad turf has been removed, a heavy dressing of good manure should be dug in, for grass needs nourishment in common with all other plants. The last act of preparation consists in spreading over the level ground about an inch depth of fine earth, which is to be distributed evenly, and every stone removed by means of the rake. Then we approach an important question—which is best, turf or seeds? In any and every case turf is to be preferred, for upon the instant of its being laid and rolled, the lawn is formed, and there is an end of the matter. Two considerations give interest to this question—the cost of turf is necessarily far in excess of the cost of seeds, and it may happen that turf is not to be obtained within reasonable carting distance. Supposing the amateur to have a choice of means and

materials, our advice would be in favour of the purchase of the best turf possible, for any extent of ground under one acre; but when we get beyond an acre, with every increase of extent, the argument in favour of seeds increases in force, for the cutting and carting of turf is a somewhat costly business. In selecting turf for a garden, give the preference to that which is of close texture, containing a fair sprinkling of clover intermixed with the finer grasses. We have formed many lawns from meadow turf, which in the first instance appeared far too coarse, and they have in the course of three years acquired a beautiful texture, fit for the foot of a princess in a fairy tale. Grass turf may be laid at any time during favourable weather, but the autumn is to be preferred, because of the long season of growth the newly-laid turf will have to aid in its establishment before being tried by the summer sun. If laid early in the spring, grass usually passes through the first summer safely, but is of necessity exposed to the risk of being roasted; in the event of a hot dry summer, the risk is greater in the case of turf laid late, than of turf laid early. When the work is deferred until the season of spring showers is past, it will be advisable to spread over the turf a coat of good manure, and keep it regularly and liberally watered until showers occur.

In selecting seeds, the character of the soil must be taken into consideration, for a mixture that would suit a clay or loam would not equally well suit a sand, gravel, or chalk soil. The seedsmen who make a "speciality" of grass seeds will for any given case supply a better mixture than any one unskilled in the matter could obtain, even if acting on the advice of a botanist or gardener. As, however, prescriptions are occasionally required by seedsmen who have not had extensive experience, we shall append to this chapter a few for mixtures adapted to particular kinds of soils. The best time in the year to sow seeds is the month of August. If the work cannot then be completed, the sowing may be continued through September and October, but not later, and may be resumed in February and March. Grass seeds may be sown, indeed, on any day in the year, provided the weather is favourable for the operation, and the ground in a fit state; but the month of August is the best time to insure a good plant before winter, and a long period of growth before the summer heat returns.

There is yet a third mode of forming a lawn, now rarely practised, but in days when grass seeds were comparatively unknown, frequently resorted to. It is termed "inoculating," and consists in planting pieces of grass turf at regular distances over the plot. In districts where good turf is obtainable only in small quantities, this method may be recommended, for if the turves are torn into small pieces, and planted at a foot apart in September or February, they will extend rapidly, and form a pretty good sward the first season.

In the after management, the principal operations consist of rolling, mowing, and weeding. Grass seeds must be constantly weeded, until the turf thickens sufficiently to kill out the weeds, and newly-laid turf must be kept clear of thistles, docks, and other

rank weeds, by spudding them out, or by a simpler process, which we have long practised with the most agreeable results, that of depositing in the heart of the plant a small quantity of phospho-guano, which kills it at once, and promotes the growth of clover in its stead. If this operation is carelessly performed, and the guano thrown about wastefully, the immediate result is a dotting of the lawn with unsightly brown patches, which, however, soon disappear after the occurrence of rainy weather.

Many as are the kinds of mowing-machines, they may all be classed under two heads—those that cut and carry, and those that cut and scatter. A carrying-machine may be made to scatter by removing the box, but not so well as the machine that is intended for scattering, as in each case the cutter is formed expressly for the work it is intended to perform. If the question be asked, which is the best form of machine? our reply is that they are of equal value, and the intending purchaser must be guided by a consideration of circumstances. In the excessively hot and dry summers of 1868 and 1870, we constantly employed the “Archimedean,” which scatters the grass, and our lawns were as green through all the burning drought as in the cooler days of spring. In the moist summer of 1871, it would have been necessary to sweep up the grass, had the scattering-machine been employed on our strong land, and therefore we kept our trusty “Shanks” at work, cutting and carrying, and had to mow twice a week through the whole of June and July to keep the grass down. Nevertheless, in that same moist summer we saw the “Archimedean” employed on a tract of chalk land, which is peculiarly exposed to the influence of the sun, and the result was a fresh green turf where in the height of summer nothing better than a dusty door-mat had ever been seen before. When the grass is cut by cutters adapted for the scattering system, it falls on the ground in a form more resembling dust than fibres, and acts as a “mulch,” both to nourish the growth and arrest evaporation from the soil; hence the importance of the scattering system on chalk and sand, and other hungry stuff, and on any soil in such a hot season as that of 1870.

In the keeping of an old lawn it is of the utmost importance to remember that grasses and clovers require for their well-doing a highly-nourishing soil. Now it matters not how good the soil may be in the first instance, if we cut and carry, we labour constantly to impoverish the top-crust. In every barrowful of grass removed, there will be a certain quantity of alkalies, phosphate-, and other constituents of vegetation, abstracted from the soil. To be always taking off and putting nothing on, must result in the starvation of the grass; and we shall find that as the grasses and clovers disappear through the exhaustion of the soil, daisies, plantains, knotgrass, self-heal, and other weeds, will take their place. The simple remedy for this state of things is manuring, and the best mode of manuring is to scatter over the turf a succession of thin dressings of guano and fine mould mixed together. This should be done in autumn and spring, at times when there is not much traffic on the grass, and there is a likelihood of rain to follow. If

appearances are of no consequence in the later autumn or early spring months, a good coat of half-rotten manure may be spread over the turf, but this proceeding cannot be recommended for general adoption. In place of guano, nitrate of soda or nitrate of potash may be employed, being first mixed with fine earth or sand, and then scattered at the rate of one pound of nitrate to every square yard. The employment of an alkali will promote the growth of grass, but not of clover, which requires the use of phosphate. A cheap and most serviceable dressing for old lawns may be occasionally obtained in districts where building works are in progress. The rubbish should be screened, to separate from it the dust of old mortar, plaster, and broken brick to the size of walnuts at the utmost. This may be spread thinly two or three times in autumn and spring, and will greatly benefit the texture and density of the turf.

It cannot be said that in British gardens grass is generally well managed and properly understood, for the lawn is the last place on which either manure or water is generously bestowed. We may oftentimes see the flower-beds deluged with water that they do not need, while the grass is fast parching into a hideous condition of sterility. If we could persuade the industrious folks to spread the water, by means of a hose, over the grass two or three times a week during summer, and give the geraniums none at all, the result would be a brighter blaze of flowers in a rich setting of delightfully fresh verdure, instead of, perhaps, geraniums growing like cabbages, and scarcely flowering at all, and the grass becoming as thin and black as if a flame had passed over it.

Two contingencies are to be especially guarded against in the management of grass turf—the machine must be set so as to cut fair, and it must be kept in the best order by constant cleaning and oiling. If set so as to cut very close, it will occasionally pare off the surface soil, and with it the roots of the grasses; many a good lawn has been ruined by the foolish practice of making the machine cut as close as possible, under the absurd impression that one cut is better than two. The more cuts the better, provided always that the machine is properly set, and in the best working order. Another mode of making a present effect at the expense of the lawn consists in continually cutting a fresh edge with the edging iron. A gardener who cuts into the turf on the edge of the lawn to make a finish, ought to be compelled to eat all that he removes. If the practice is persisted in, the grass is reduced in breadth, and the walk is widened, and in time there is formed a deep gutter and a sharp ugly ridge. If properly finished at the edge with the shears, the width of the walk will not vary an inch in fifty years. One of the first things we look after in the work of a new man is his management of the edges of lawns, and we are always careful to explain our views upon the subject in good time to prevent a mischief which cannot be easily remedied. The man who persists, after warning and explanation, in chop, chop, chopping at the edge, as if it were necessary to construct a gutter of mud on each side of a walk, deserves to hear an opinion of his procedure that will make him

tingle from head to foot with shame. The jobbing gardener is a master of this chop-down-gutter-forming business, and will always be ready to advise the employment of gravel to fill up the trench that should never have been made.

HYBRIDIZING.



It is undeniable, however much the mere botanist may regret the multiplication of seminal varieties of cultivated plants, that to the art of the hybridizer our gardens are indebted for some of their most striking features. In support of this opinion, we need only cite the dahlia, the pansy, and the hollyhock, which in their primitive condition would hardly be tolerated by cultivators of the humblest aims, but which, from the immense improvement which has resulted in their form, size, and colouring, are now justly considered necessary in gardens of the smallest extent. And even in the case of those plants which come forth from the hand of nature arrayed in charms which it were profanity to impeach, much has been done in introducing a greater variety of tints, in improving the habit of growth, and in combining in one plant the perfections of many.

We have no doubt that a few hints on the process by which these results are attained, will be interesting to some of our readers at the present season; and we offer them the more readily, that the operation is of the simplest character, and may be performed by any intelligent person, and upon almost every description of plant. If a blossom of any plant—one of the lily tribe for example—be examined, we observe (in this instance) at the bottom of the flower a green triangular body, surmounted by a column one or two inches long, and terminated by an enlargement which, at a certain period after the expansion of the flower, will be found covered with a clammy secretion. These central organs are the *germen*, or immature seed vessel, with its *style* and *stigma*. Around them will be found six *stamens*, also arising from the bottom of the flower, each consisting of a *filament*, or stalk, and an *anther*, or case, borne at the summit, containing a coloured substance (the pollen), destined to the fertilization of the ovules or young seeds contained in the *germen*. When the flower first opens, the anthers will be found plump and smooth; but in a short period they will be observed to split longitudinally, and become mealy in their appearance, from the escape of the pollen. These pollen-grains, when brought into contact with the neighbouring stigma, protrude a number of extremely minute tubes, termed *pollen-tubes*, varying in size from $\frac{1}{1000}$ to $\frac{2}{1000}$ of an inch in diameter, and including within them a portion of the contents of the pollen-grain, which consists of a semi-fluid matter termed the *fovilla*. These tubes, which appear to be formed from the inner membrane of the pollen grain, are believed to penetrate the loose tissue of the stigma, and to pass down the style to the ovary, where they exert their fertilizing influence on the young ovules.

The purpose of this paper being, however, entirely practical, we purposely avoid all further reference to the different theories promulgated on the manner in which impregnation is effected; it is sufficient to show that, unless the pollen reaches the stigma, no perfect seeds will be ripened—an assertion easily verified by cutting out the *anthers* of the lily, or any other flower, as soon as it expands, when the seed-vessel will be found to wither away; and if, in some few cases, it does become considerably developed, it will either yield no seed, or only such as have no productive power. If, however, after the stamens are removed, others from a flower of the same, or of another species, are dusted on the stigma, the seed-vessels will swell, and eventually ripen its seeds, exactly as in the case of those blossoms from which their proper stamens had not been artificially removed. In this consists the whole art and mystery of cross-breeding. But simple as the actual conveyance of the pollen of one species to the stigma of another may be, certain precautions are necessary to success, and if we desire to control the result, certain laws must be complied with; but which, to speak frankly, we attach less importance to, as the results are often of the most contrary character, One or two of these laws are, however, so natural, that they cannot give rise to the smallest doubt.

1. No plants which do not belong to the same natural order, can by any possibility be made to intermingle. The absurd stories related of the origin of Willmore's double pelargonium (*Surprise*), which was said to be a mule between a geranium and a hollyhock, and of some other hybrids, need no refutation.

2. No plants which do not form part of the same *genus* can be united by cross-breeding. This law may at first sight appear to admit of many exceptions; but it is highly probable that, in many instances in which a reputed union has taken place between plants of two distinct genera, a further examination would prove that two genera had been improperly separated, and did in reality constitute but one. Should, however, the statement with regard to the recently originated *Cheiranthus Marshallii*, which is said to be the offspring of the *Cheiranthus ochroleucus*, crossed by the pollen of *Erysimum Perofskianum*, prove true, this law would have to be relinquished, for of the wide distinction between these two genera, there is no doubt whatever.

3. Even among species belonging to the same genus, it is only those of similar structure which will yield hybrids. Thus the gooseberry and currant, though both belonging to the genus *Ribes*, have never been made to unite. It has been supposed that union can only take place between these species in which the pollen grains are of the same size; and should this supposition be confirmed, a preliminary microscopic examination of the two varieties of pollen would enable us to judge of the probability of obtaining hybrids between any two species.

Where no natural hindrance exists to the union, the following precautions are all that are necessary to success.

1. The anthers or pollen bags of the plant which we desire to impregnate artificially, should be removed immediately on the expan-

sion of the flower; or, if when this takes place, they are already burst, it will be necessary to open the flower prematurely, for it is essential to success that the anthers should be cut out before their pollen is ripe. In some of the *Campanulas* the anthers burst previously to the opening of the flower, and also in some of the *Cytisus* family, and probably in many others.

2. When the anthers have been thus extracted, the stigma of the flower must be carefully preserved from accidental impregnation by insects or other means, until it is in a fit state for the reception of the pollen of the species with which we desire to hybridize it. This end is best attained by tying a piece of fine muslin over the branch on which the blossom is situated.

It is usually easy to perceive the proper moment for the application of the pollen, for the stigma, in most instances, exudes a viscid fluid; and in those plants in which it is divided into lobes at its extremity, as in the *fuchsia*, *geranium*, *clarkia*, and many others, these lobes, which on the first expansion of the flower are commonly indistinguishable, diverge and spread themselves towards the anthers. In some plants, especially in such as have fugacious blossoms, the stigma is fit for the reception of the pollen as soon as the flower has opened; in others, not until a few hours after expansion; and in the lilies, neither the pollen nor stigmas are fit for the operation of hybridizing until after an interval of one or two days from the opening of the flower.

3. The operations should be performed only in dry weather; for when moistened, the pollen-grains are ruptured and lose their fecundating power. This explains the injurious influence of heavy rains upon many crops when in flower, as well as upon fruit-trees. In many plants the flowers close in wet weather, apparently with the intention of preserving the pollen and stigma from injury.

4. The actual operation of hybridizing consists simply in removing the anther, or, if necessary, the entire flower from the plant with which we desire to cross another species, and in applying the anther in a dry, mealy condition to the stigma, by bringing them into contact. Some hybridizers collect the pollen with a small camel's-hair pencil; but, whenever it is possible, we advise the anthers themselves to be applied, without any intermediary. As the pollen of most plants is coloured, its presence upon the stigmatic surface will be easily detected. The quantity of pollen necessary for the fertilization of the ovules of any plant varies exceedingly in different species; it is better, however, to use too large than too small a quantity. As a general rule, it may be advisable to apply to the stigma of one species the whole of the anthers of the male flower. When practicable, the anthers should not only be rubbed upon the stigma, but also be inserted in the centre of the flower, where the arms of the stigma will often suffice to retain them. The pollen of some plants may be preserved for a considerable period, especially if kept dry, but in practice it is advisable to apply it as soon as ripe; though where two species, which it is desired to cross, are not simultaneously in bloom, the experiment may be tried

of preserving the anthers between two pieces of glass until the expansion of the flowers of the other species.

The stigma of most plants are sufficiently apparent to render any special instructions unnecessary, except in the instance of one or two plants. The stigma of the iris is sometimes quite a puzzle to the inexperienced florist; but it is, in reality, as easily seen as in any other plant. If the petal-like body, usually of a vaulted form, which covers over the anther, be slightly raised by its bifid lid, a thin membranous ridge will be observed immediately below the lip, at the point where it is, when shut, in contact with the true petal beneath it. The whole of this membranous edging may perhaps act as an absorbing surface for the pollen, which will generally be found upon it after the opening of the anther; but the central portion between the bifid lip is no doubt the true stigma. After the application of the pollen, the stigma either withers, or loses its viscidty, changes which may be deferred for some days by preserving them from contact with the anthers. This well-known fact may be made available for the prolongation of the blossoming period of most plants; for after fecundation, not only the stigma, but also the entire flower, rapidly decays.

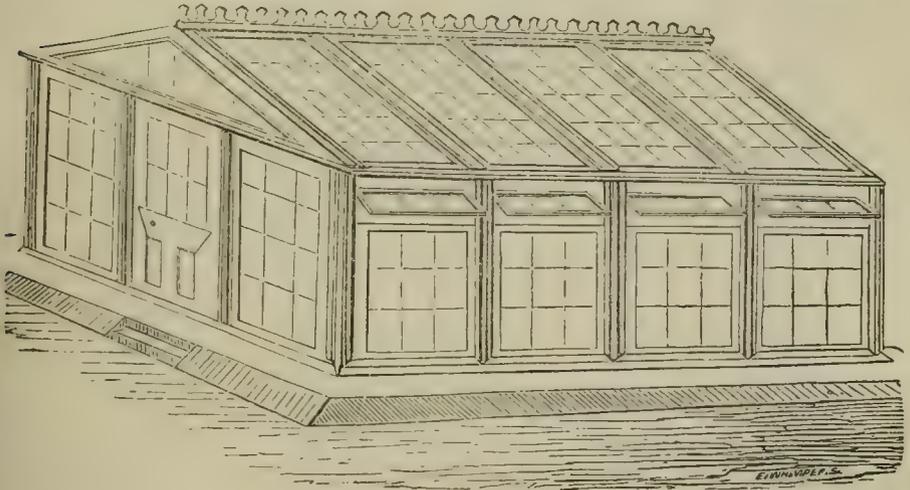
It is generally supposed that in hybrid plants, the flowers and organs of reproduction partake of the characters of the female parent, while the foliage and habit resemble those of the pollen-bearing plant. This is, however, by no means an established law, for the plants raised from the same pod of seed, will often contain individuals, some of which resemble the male plant, whilst others inherit the leading features of the pistilliferous plant. Hybrid plants usually ripen seed, but their offspring seldom continue fertile beyond the second or third generation, though to this rule there are many exceptions. They may, however, be fertilized by the pollen of one of the parents.

The choice of subjects for hybridization is obviously a matter for the exercise of individual taste. Much has been done by the florist in improving some of our cultivated plants, but an immense harvest remains to be gathered amongst our hardy bulbs, shrubs, and perennials; and every amateur florist may be assured that it is fully within his power to originate, in each of these sections, new varieties which would yield him both fame, pleasure, and profit. To each of our readers as may be induced to try their hand at this interesting art, we earnestly recommend that a record of each experiment and its results should be kept.

MOVABLE PLANT-HOUSE.

BY the law of this country, the amateur's plant-houses, from the moment of their fixture in the soil, become the property of the freeholder; and although very few houses indeed, unless expressly built for the purpose, are worth removing, yet the amateur generally feels regret, on changing his abode, that he cannot take his greenhouse with him; and this article is intended to assist those who are desirous of constructing a house that is capable of being taken down, removed, and re-erected, without injury.

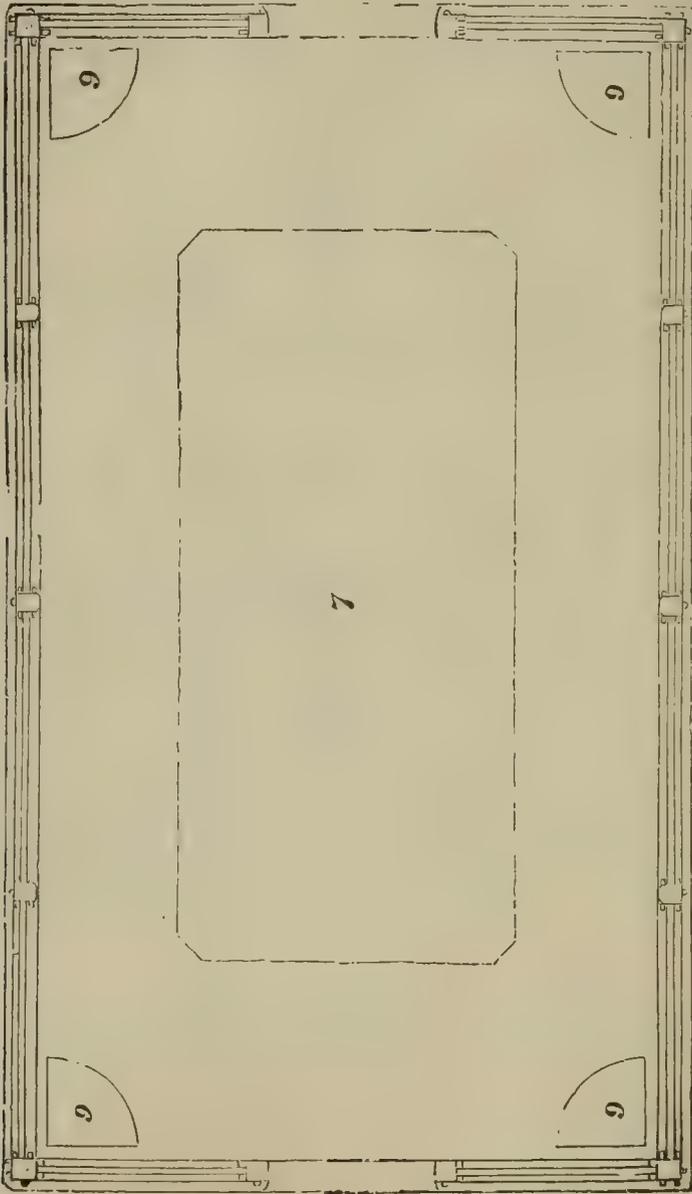
The diagram of the elevation shows a detached building set upon a raised platform of earth, to give it a greater apparent elevation, with a gravel walk surrounding it, and two steps placed in the grass slope, by which to ascend the platform. The house is composed of parts that, when taken to pieces, may be easily packed up conveniently for carriage, and is thus constructed. First, a



REMOVABLE GREENHOUSE.

ground sill, which may be of teak, if the expense is not an object, seven inches wide by four inches in thickness, the four sides of which are held together at the angles by means of irons screwed on with square-headed screws (Fig. 9 a). No pegs or nails are to be driven into any of the mortise tenons, but in every part use in lieu thereof, either the screws Fig. 9 a or Fig. 9 b. The studs are mortised into the sill, and have a substance of four and a half inches by four inches; and these again are mortised into the rafter-plate (see section, Fig. 11). Between these studs (see section, Fig. 10) the sashes (b) are set up, and to keep them steadily in their places, splines (c) are braded on to the studs. These sashes may be exactly like those used in house building, without, of course, the accompaniment of boxes and weights. Upon the front of the stud a half-circular moulding (c) may be braded to give a degree of lightness

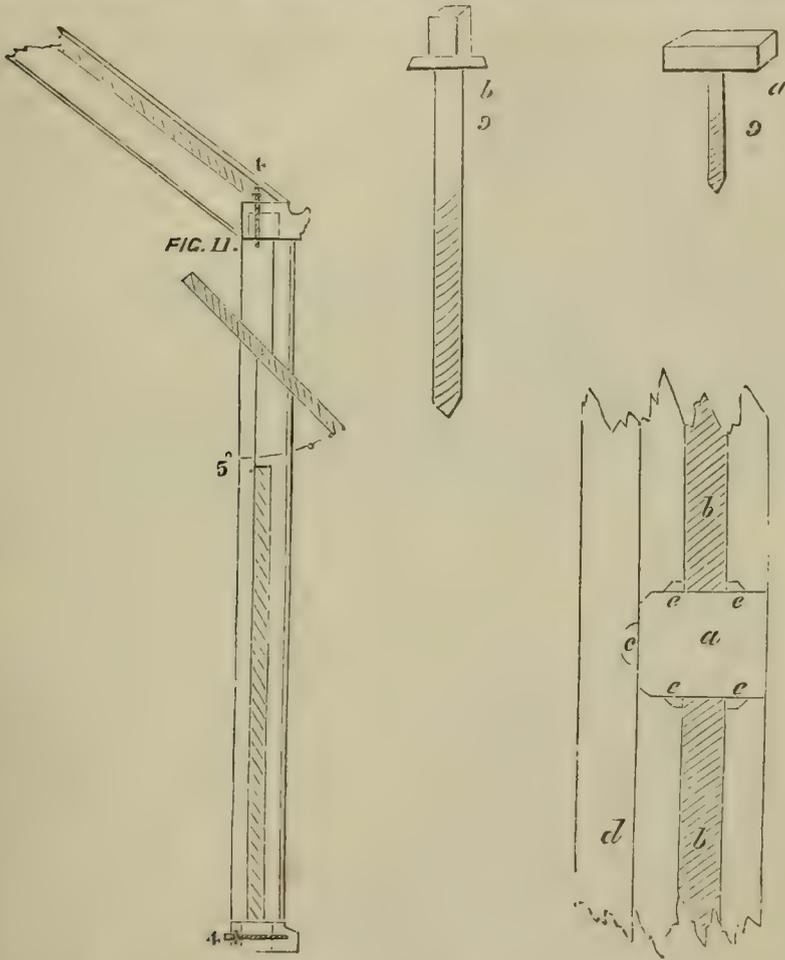
to the appearance. Also to the same end, as well as to throw off water, let the sill be bevelled at *d*. Above the sashes are to be hung on pivots small lights for ventilation. These may be opened and kept so by means of a small iron having holes in it, to drop on



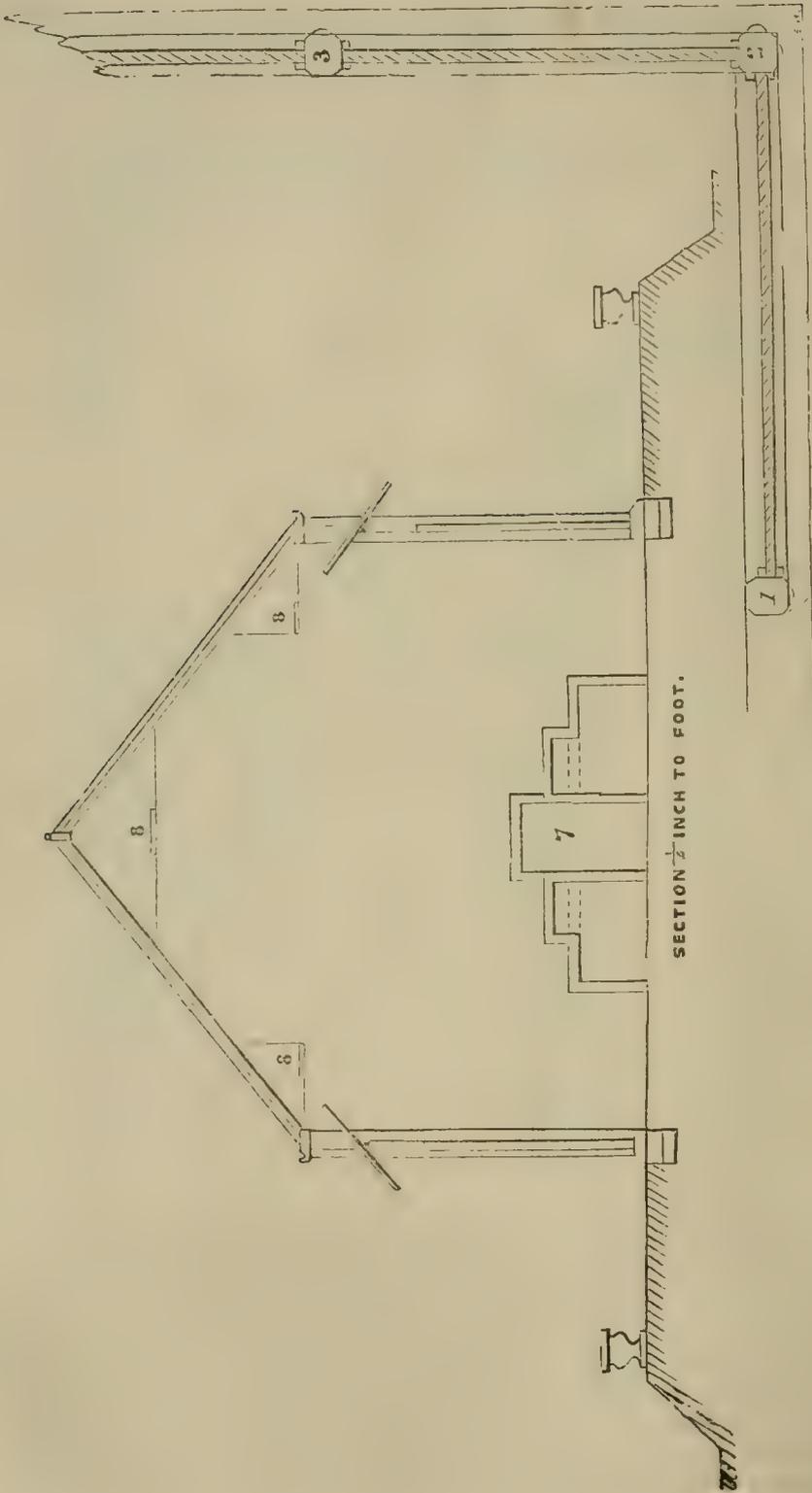
GROUND PLAN OF REMOVABLE GREENHOUSE.

to a pin fixed in the lower sash (Figs. 11—5). This iron must also have a joint so as to hang down when the ventilator is shut. The rafter plate and gutter are formed out of one piece, seven inches by four inches, and the gutter must be lined with zinc or thin lead, to prevent the water injuring the wood. A small lead pipe will convey

the water down the inside angle of the building into a drain or tank; the rafters are five inches by three and a half inches, and have a beading braded on to their under side, and a capping on the top, for the double purpose of keeping the roof lights in their place and the water from getting into the house; but in addition to the capping, the lights must have screws (Fig. 9 *b*), commonly known as bed-screws, put through the top and bottom into the ridge-tree and rafter plate. The rafters and studs must likewise be secured



by these screws, as at Figs. 11—4. In the section, Figs. 1, 2, and 3 show the door stud, the angle stud, and one of the side studs, which are all of one size, the difference consisting only in the putting on of splines and mouldings. The end gable lights may be fixed in their places by means of splines, in the same manner as the side sashes. In the same section, Fig. 8 represents light iron rods suspended from the rafters, as bearers of light shelves, for the accommodation of bedding plants, or other small things which require a situation near the glass. Referring to the ground plan (9, 9, 9, 9) are boxes placed in the angles, in which may be planted climbers,



SECTION 1/2 INCH TO FOOT.

SECTION VIEW OF REMOVABLE GREENHOUSE.

to train over the roof or sides of the building. Fig. 7, stage, which must be strong enough to bear the plants, but may be made in parts, so that it can be removed without having to be knocked to pieces. It will be necessary, in order to protect the building from damp and the liability to settle down, to place it upon some firm and solid matter let into the ground, as brick piers or wood blocks. A platform of bricks laid on the surface, gives a firm and lasting foundation, provided the subsoil has not been recently disturbed.

The heating of a movable house must also be managed by a movable apparatus, which will be some kind of stove, and which must have a pan on the top to hold water; and as artificial heat in such a house as this will only be required in winter, the stove might, for that period, occupy a place near one of the doors, and the smoke-tube be carried through the glass at the top of the house. Should a building of this kind be required for vines, the side lights should be reduced to one half the height, and these to open, as here shown, for ventilation; the roof lights would then be longer, and a much steeper roof obtained. A small aperture or two at the ridge, capable of being closed by a wood slide, would, with the side lights hung as recommended, effect a perfect ventilation. The walk would, in such a house, be down the centre, and the vines might be planted in boxes, having large openings in their bottoms to allow the roots to escape into a border made up inside the house for that purpose. The planting them in boxes would enable them to bear removal at almost any season.

AUTUMNAL SHIFTING OF PLANTS IN POTS.



EXCEPT those of very slow growth, all plants which have stood in pots during the summer months, will, by this time, have become partly root-bound, by filling the pot with their roots; and unless they are looked after in time, will put on a sickly appearance, their leaves growing yellow, the young branches shooting weakly, and the flower-buds, if any, shrivelling and falling off without expanding. The remedy for all these evils is repotting in fresh earth, which ought to be done, if possible, before the middle of September, for room-plants, or those which cannot be protected during winter except in a cold frame or a greenhouse. Where artificial heat is at command, the season is less important. If the shifting be delayed later for most sorts of room plants, they will not have time before the setting in of cold weather to establish their roots in the fresh earth.

These remarks apply more particularly to geraniums, fuchsias, hydrangeas, and calceolarias. Some sorts, such as myrtles, oleanders, creeping cereus, American aloe, and other succulent plants, will not require shifting oftener than once in two or three years, and then the spring is perhaps the best time. But though large-growing plants or shrubs, such as orange-trees, after being stationed in the

fullest-sized pots, tubs, or boxes, do very well for several years without shifting, they should from time to time, both in spring and autumn, have the surface earth loosened, as well as the portion nearest the pot or box all round, as deep as it can easily be reached, removing the loosened old soil, filling up the deficiency with fresh earth, and giving a moderate watering to settle the roots.

When there is want of space for arranging pots during the winter so as to admit abundance of light, which is indispensable to the health of the plants, it will economize room to put as many plants into two or three large pots (say thirty-two, or even twenty-fours or sixteens) as can conveniently be done; and with this view, small plants of geraniums and the like may be procured from cuttings struck late in summer or early in autumn.

When small plants from cuttings have not been forwarded, the large plants may be cut down to small dimensions, and the roots proportionately reduced.

In the spring shifting, each of these stored plants may be placed in a separate pot and kept protected in-doors, at least during the night, till the end of May or beginning of June, when the plants may be turned out into the borders to bloom. Another method, which we have seen successfully practised by the late lamented Mr. Sweet, when there is scanty space for protecting plants in pots during the winter, is, at the autumnal shifting, to plunge them in the borders, taking care to have several inches thick of sharp sand or forge ashes below or around the pots plunged, to prevent their being too much wetted by the winter rains. Over the plants in cold or frosty weather, and always at night, place an empty pot, covering the hole with an oyster-shell or a bit of tile. In this way Mr. Sweet could preserve in health many half-hardy plants through the winter, better, as he told us, than in-doors. Of course the empty pots used to cover the flowers will require careful attention to place and replace them, but not more trouble than is usually taken with room plants. In the management of shifting, it is for the most part to remove the plants from smaller to larger pots, with the balls of earth about the roots, either altogether or at least some of the old earth on the outside of the bulb, trimming away only the radical fibres which are matted and dry, but taking care not to disturb the principal root near the centre.

In this way a great portion of the excrementitious matter which the smaller radicles have thrown out into the exterior soil will be got rid of, which, if not removed at intervals, acts as a poison to the plant—a recent discovery of great importance to be attended to in every species of plant cultivation. In the meanwhile, the principal roots remaining undisturbed, the growth will not be much checked by the shiftings, more particularly as the heat of the weather being now on the decline, and the days becoming shorter, there is less stimulus to rapid growth and exhaustion of vigour by sunlight and heat.

In some instances, when individual plants or shrubs in pots discover, by the decay of their top shoots, that they are in a declining state, the cause may probably exist in either the main

root, or in the old balls, saturated with the excrementitious matter just alluded to.

In such cases it may be proper, on shifting them, to shake the earth in the ball entirely away, or even to wash it off in water of not too cold a temperature, in order to examine the roots, and to trim and dress them as the case may require. These must, of course, be replanted in fresh earth.

When larger pots are required for shifting the plants, these ought to be provided of suitable sizes, according to the sorts of plants, and the whole placed ready, together with the necessary quantity of potting compost, containing due proportions of sand, loam, or peat, and some well-rotted dung.

The chief danger to plants in pots during winter, is having the roots chilled with too much moisture, and, therefore, more sand may be used in the compost than for the spring shifting. For a similar reason, the pots should have a very efficient draining, not only by placing an oyster-shell or a bit of tile over the hole, but also by an inch depth or so, or even more, according to the size of the pot, of broken potsherds or cinders, about the size of hazel-nuts. This drainage both prevents the earth in the pot from ever remaining too wet, and likewise, by allowing the water to run freely off, washes away the excrementitious matter which the plants are constantly discharging in a similar way to the excrementitious discharges of animals.

Particular sorts of plants, indeed, owing to the deterioration of the earth by the discharges just mentioned, as well as by the exhaustion of nutritive matter, require shifting, more for the advantage of having fresh earth, than for the want of new or larger pots; and as in this case some of the same pots may be still of an eligible size to repot them in, these pots should be well cleaned from all adhering parts of the old deteriorated earth, and be replenished with fresh composts, when the plants are repotted. When the pots intended for the reception of the plants are prepared, by making the drainage, as already directed, let the fresh compost be filled in from two to four inches deep, according to the size of the pots, and let the plants be set in them with their balls of earth, or their trimmed roots, as the case may be. Fresh compost must then be added all round and above, so that it may stand at least an inch, if not more, above the surface of the old ball, or the crown of the root, when the ball has been reduced. A moderate watering must then be given to settle the earth and refresh the roots. When the ball has not been reduced, or at least only on the outer surface, it may be proper, previously to the watering, to loosen it all round, by means of a thin piece of stick, or a two-pronged table-fork, to guard against injuring the roots, which might be occasioned by using a knife for this purpose, as is sometimes done.

If the leaves of the plants be dusty or foul, water should be thrown over them from a watering-pot, with a very fine rose, or what is preferable, they should be exposed to a good shower of rain if it be not very heavy, to clean them; for nothing is more injurious to the healthy growth of plants, than extraneous matter adhering

to the leaves and obstructing the pores. This indeed affects in a similar manner the health of plants, as mucus accumulated in the lungs affects the health of animals; the necessary changes of the sap into pulp, as of venous into arterial blood, being prevented without a due exposure of the same in the leaves or in the lungs to the influence of the air. Accordingly, when the shifted plants have been accidentally exposed to too heavy rain, which will cause the earth to spurt about and soil the lower leaves, these should be carefully cleaned by watering with a fine rose, or by gentle brushing with a clean painter's brush dipped in water.

In setting the pots which have had plants shifted into them, they should be placed for two or three weeks in a shaded spot, at least, in bright weather, for otherwise the sun's light will be apt to cause them to droop, till they have struck fresh root. Care must also be taken to give them repeated waterings, particularly when the weather is dry.

It is a common, but a very bad practice, to set the shifted plants on the garden borders or the walks; for not only the nights are now becoming cold and the ground is therefore rendered chilly, but worms and slugs get below the pots, the latter sallying out at night from their lurking places do no little damage, besides often depositing the eggs to be hatched in the ensuing spring, within the holes of the pots under the oyster shell. The best thing for placing the pots upon after shifting is, a bed of sifted coal ashes, two or three inches deep, which will both keep off the slugs and worms, and prevent the chilliness of the ground from affecting the plants. When there is not convenience nor time to make a bed of ashes for this purpose, a deal board will answer pretty well. Flower-stands with shelves elevated above the ground would answer, except for the circumstance of their exposing the plants to a greater degree of cold, at least when there is any wind stirring.

When shifted plants are placed, during the day, on the outer window-sill, and taken in at night, they only require great attention to watering, from the greater dryness of their position.

Next month we shall give directions for planting bulbs, and for growing them in water glasses.

THE CULTIVATION OF THE STRAWBERRY.



HERE is not one subject connected with horticulture which appears to merit the attention of every country reader, more than the culture of the strawberry. The fruit is so beautiful, so salubrious, so grateful to the palate—to say nothing of the elegance and charming scent of the blossoms which precede it—that we cannot refrain from offering the experimental remarks which follow, to the notice of our friends.

We will refer to acknowledged authorities, because we desire to

attract attention to two methods of culture; but the substance of our paper shall be strictly experimental and practical.

September is the season which is most suitable to the preparation of beds and rows of plants; the season is mild, the ground is usually moist, the sun retains a sufficiency of active power, and the runner-plants are firmly rooted, and can be removed with safety. It is now too late to direct the preparation of these plants; but in fact nature does the work for us, unless, indeed, every runner shall have been extirpated as it protruded. Presuming, then, that they who possess strawberry-beds and favourite fruit have a stock of young plants, we shall only say that at this season numbers are to be seen which occupy as much space as would be covered by a full-sized saucer, have four to six strong and healthy leaves which surround, and, at their origin closely embrace, a bold, prominent, central bud, which appears firm to the touch. Such are the plants which are fit for the work we contemplate, and they usually are found at the ends of the string which proceeds immediately from the parent stock. In order to insure fertility, persons ought to know whether that stock is fruitful or not; for it is quite certain that the largest and most beautiful plants are too often quite barren; and these are peculiarly productive of runners, whereas few secondaries, comparatively, proceed from these plants which furnish the best fruit.

Presuming that these preliminary remarks are duly appreciated, we will dwell on them no longer.

There are three varieties which, if a good garden once possess—true to their kind—will effect all that the most luxurious can desire; they are indeed “redolent of sweets.”

1. Keen's Seedling, for abundant early supply. 2. The Old Pine, for very superior flavour, rather later. 3. The Elton, *i.e.*, “Knight's Elton,” late, large, beautiful to the eye, and when perfectly ripe, of very full, peculiarly grateful flavour, tending to acid. But the season and time of bearing of *all* may be modified by planting each in south, east, and north aspects; and by so doing, if the season be early, warm, moderately showery, yet generally fine, a good supply can be obtained from the first week of June to that of August.

Prepare the ground three weeks before it is wanted, trench two feet deep, manure with rather recent stable dung to the bottom, but not very profusely; a good turfy loam, free and velvety, is above all things desirable. No bad earth should be brought to the top; it will be safer, as Keen observes, to simply dig the lower spit to add the fresh dung upon that, and to keep the good upper soil at top, effectually digging and pulverizing it.

The plants and land being ready, we will first allude to the method adopted by the Rev. T. Garnier, and thus described in the Transactions of the Horticultural Society. It implies the annual renewal of all the beds, but he begins his operations earlier than experience would permit us to recommend.

“Early in August, or as soon as the gatherings are over, I destroy all my beds, and proceed immediately to trench, form, and manure them in the manner before directed, to receive the plants for the crop of the ensuing year, taking care to select for that purpose the

strongest and best-rooted runners from the old, rejected plants. If at this season the weather should be particularly hot, and the surface of the ground much parched, I defer the operations of preparing my beds and planting them till the ground is moistened by rain. Such is the simple mode of treatment which I have adopted for three successive years, and I have invariably obtained upon the same spot a great produce of beautiful fruit, superior to that of every garden in the neighbourhood. Depth of soil I have found absolutely necessary for the growth and production of fine strawberries; and where this is not to be obtained, it is useless, in my opinion, to plant many of the best varieties. It is not generally known, but I have ascertained the fact, that, most strawberries generate roots, and strike them into the ground nearly two feet in the course of one season. The Pine and Roseberry succeed better than any other in stiff and shallow soils, but they should always be in an open situation, and not, as is too commonly the practice, in shady and neglected parts of the garden."

By associating the instructions conveyed in the foregoing quotation with the preliminary remarks, the reader will be fully qualified to prepare annual beds; and it is quite certain that yearling plants can produce perfect fruit. We will now allude to the triennial course.

The ground is prepared and manured, and the plants provided as in the former case; it may also be understood that the planting can be conducted in the form of single border-rows, or in plots, at discretion. If in the former, the row should have an open space of at least one foot, or eighteen inches, of clear ground on each side of it; and the plants should be set by the trowel one foot asunder, securing the roots firmly in the soil, the fibres being expanded so as to be covered by earth in every part. If beds be adopted, the same distances are to be maintained, but the rows must be two feet asunder, with alleys of approach by the sides laid with coal-ashes. Water must be freely given from the rose of a water-pot in the evenings, till the plants stand firm and erect under the full sun. After which the ground should be flat-hoed, to bring the earth close around the base of each root, and obliterate the smallest weed.

In this system every blossom shown in the following spring is pinched off, not one plant being suffered to bear fruit; therefore it will be proper to leave a few old beds to bear while the plan is in progress. The runners, as they appear, are cut away, and weeds regularly destroyed. Throw a little fresh loam and reduced manure, mixed in equal proportions, along the rows on each side, to enrich the ground, while it protects the plants during winter; and in March, take off the dead leaves and fork the spaces.

This is to be the practice of each year. Suffer all the plants to bear in the spring, and the crops will be in perfection; cut off runners and observe other directions. In the third year the crop will be very fine; but now the end of the course is come, and the plants are to be rooted up. Therefore, to perpetuate the succession, new beds or rows must be begun every year, so that there shall always be a set of plants advancing through one or other of the stages. To provide new plants, a sufficiency of the finest runners

of the third year's plants, must be allowed to fix themselves in the ground of the intervening spaces, keeping them apart from the old plants to benefit by full exposure to air and sun.

Every operation of the garden demands patience and assiduity ; but we know of no method of strawberry-culture which implies less labour than the one we have described.

Every operation must, however, be foreseen, and timely performed ; otherwise, litter and crowding will occur, and produce mischief.

It only remains to add that the same ground may be replanted during several courses, provided two or three inches of fresh rich loam be thrown about the rows every winter.

WINDOW GARDENING.

BY JOHN R. MOLLISON.

(Continued from page 243.)

HARDY FERNS.—CONTINUED.



THE article on Window Gardening, in our last number, contained nearly all the dwarfer-growing hardy ferns suitable for our purpose. So now we will briefly notice the larger-growing species. They are all very handsome, and being the most common, they are generally the easiest to get. The male fern, lady fern, and mountain buckler fern especially, you will find in great abundance all over the country. In moist woods they attain great luxuriance, adding greatly to the charms of the sylvan shades, with their graceful feathery plumes.

Lastrea Filix-mas.—The male fern, or common buckler fern, is a very robust tufted growing species. The fronds, which are produced from a crown, rise from one to two feet in height, supported on densely-scaled brownish stipes, and are broadly lanceolate in shape, divided, the divisions in pairs along the rachis or midrib, and very regularly deeply lobed or cut. It is of easy cultivation.

Cristata is a notable variety of the species, of a curious, handsome habit, having the points of the divisions and fronds fringed and tasselled.

Lastrea oreopteris, or mountain buckler fern, is much like the preceding species. The fronds rise to the height of from one to three feet, in a circular fashion, from a crown. It occurs abundantly in woods and heathy commons. It has one great peculiarity, being very fragrant if bruised or drawn through the hand, and is of easy cultivation.

Lastrea æmula, or hay-scented buckler fern, is an elegant, moderately-sized plant, of a tufted circular habit of growth, the fronds rising from a crown. They are divided and subdivided, the lobes round the margins of the divisions recurve inwardly, giving the entire frond a peculiar crisped appearance. The fronds are triangular

in shape, and the entire plant has an elegant drooping habit, and is evergreen. Its moderate size makes it a good pot plant. It is found in Ireland and the western parts of England.

Athyrium Filix-femina, or lady fern, is the most handsome and graceful of all British wild ferns. No one among them can equal its exquisite beauty of outline. It is of a tufted habit of growth, the fronds rising in circular fashion from a crown, and varying from one to four feet in height, according to situation, appearing in April or May, and dying down with the first frost of autumn. They are broadly lanceolate in shape, and divided; the divisions also lanceolate, subdivided, and more or less lobed round the margins, which are sharply toothed, giving the entire plant an exquisite gracefulness of outline.

It is a splendid plant for a pot when a large specimen is required, and is the easiest of all the British wild ferns to cultivate, requiring plenty of room and moisture.

Among the many varieties of the lady fern, *multifidum*, *crispum*, and *Frizellia* are among the best.

Polystichum angulare, or the soft prickly shield fern, is a very common fern in some localities. It is a very strong-growing species of the shield ferns. The fronds, which rise in a tufted circular manner from a crown, vary from two to four feet in height, are lanceolate in form, and divided, and supported by shaggy, chaffy, brownish scaled stipes. The divisions are also lanceolated and divided into neat prickly toothed, shield-shaped pinnæ or leaflets, darkish green in colour. This fern is nearly evergreen, the fronds remaining green through a moderate winter till the young fresh ones appear in spring.

As a large specimen for pot or rockwork, it is a very desirable fern, of very easy cultivation.

Cristatum is a curious and beautiful variety, the points of the fronds and divisions being tasselled and crested much like the crested male fern.

Polystichum aculeatum, or common prickly shield fern, is very like the preceding, only it has a more rigid habit; the pinnæ or leaflets are smaller, of a dark shining green, and of a harsh rigid texture. It is much commoner than *P. angulare*, being met with almost everywhere, and is also nearly evergreen, remaining green through moderate winters in moist situations. It is very easily cultivated, and makes a good pot plant when large specimens are required. It does well in rockwork.

GREENHOUSE FERNS AND MOSSES FOR WINDOW GARDENING.

Our list of suitable ferns for window gardening would not be complete without a few of the hardier greenhouse species and varieties. Those of our readers who have a miniature greenhouse can grow many of the hardy greenhouse ferns very well if care be taken to keep them properly watered and shaded from the sun's warm rays. Ferns, as a rule, do not love the sunshine, thriving best in moist, shady places. This should be borne in mind by my readers. Try, therefore, to supply your ferns with the necessary

shade and moisture, and there is no fear of your being unsuccessful. The most preferable way of growing them, especially the dwarf tender species, is in a Wardian case. But very good specimens can be got up in a pot in the window, if a miniature greenhouse or Wardian case is out of your reach.

It will be quite unnecessary to enter into details regarding the distinctive marks and habits of the few greenhouse ferns I shall select. I shall merely draw up a short list of the varieties considered suitable for your purpose, from which you can select at pleasure. They can all be procured from any respectable nurseryman at moderate prices.

Adiantum cuneatum and *Adiantum formosum* are two favourite maidenhair ferns found in all greenhouse collections; also *A. pedatum*.

Asplenium attenuatum and *Asplenium bulbiferum* are two excellent greenhouse spleenworts, *A. bulbiferum* especially being a handsome plant found in all collections. *A. flabelliforme* is also excellent.

Platycarium alicorne, the curious elk's-horn fern, has the true appearance of an elk's horn.

Davallia canariensis, or the hare's-foot fern; the creeping stems of this curious fern are very massive and hairy-looking, having just the appearance of a hare's foot. *D. alpina* and *D. elegans* are very good.

Pteris serrulata, a graceful favourite greenhouse fern. *P. s. variegata* is a variegated form of the above.

Pteris serrulata cristata, is a crested variety of the above, and quite a gem.

Pteris crætica albo-lineata is a beautiful variegated fern, and an excellent variety for pot culture.

Pteris tremula is a strong-growing triangular fronded fern, rather like the common bracken, though finer in form. A capital plant for pot culture from its readiness to grow. Also *P. ternifolium*.

The Mosses or Selaginellas of the greenhouse are beautiful subjects for window gardening. The common greenhouse moss, *Selaginella denticulata*, especially, might grow in several patches among the gravel or sand on the floor of your miniature greenhouse, and would add an extra charm to the general effect. A little bit in the flower or fern pots if not allowed to spread over the surface, to exclude the air, looks very interesting, and a pot or pan filled with it, or the variegated variety, looks very neat and pretty, and makes a tasteful centre for a table when grown into a dense mass. To propagate the selaginellas, or mosses, you only require to take a few points of the plant, and insert them over the surface of the pot. They take root easily but require to be kept damp, and shaded from too strong light and sunshine.

There are a good many of them that would suit window gardeners, but besides the two I have mentioned, *S. denticulata* and *S. denticulata variegata*, there are only three others I will recommend. *Selaginella cæsia*, or the blue-shaded moss, which looks beautiful suspended in a pot, having a trailing habit; *Selaginella stolonifera*, a

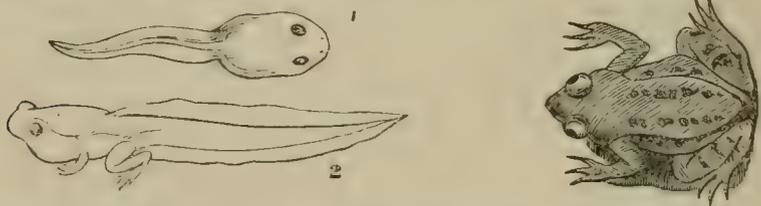
very pretty pot plant; and *Selaginella Willdenovii*, which sums up the whole list. There is no doubt but you will be able to make a very suitable selection of ferns and mosses from the list I have drawn up, and with proper attention to watering and shading, I am sure you will be successful. The cultivation of ferns has a peculiar charm for some people, and there is much to be said in their favour, for there are always the charms of grace and beauty to delight the eye in their presence before us.

(To be continued.)

INVADERS, VISITORS, AND SETTLERS IN OUR GARDENS.

(Continued from page 236.)

THU will now describe what may be thought, perhaps, to be the very ugliest of all the dwellers in our gardens, and yet it is one who has much in its life that is very curious. It has, in fact, a sort of double life, being at first an inhabitant of some pond in the neighbourhood of the garden where it is found, in form very like a fish, and feeding on water plants, and afterwards becoming a land animal, and requiring for its support flies, slugs, small beetles, and worms. We know him best when, as a frog, he sits under the shelter of some large cabbage or rhubarb leaf, or among the strawberry plants in our gardens, careful not to expose himself to the heat or light of the sun, for he likes shade and dampness as much as a snail; in fact, his life depends on keeping his skin moist, and he would die were he to be exposed to the heat of the sun, so as to have his skin dried up. There he sits, grave and ugly; his prominent eyes on the look out



for any living creature on the wing that may come near, and with his great mouth ready to open like a trap, and his long tongue prepared to dart out to capture the prey!

The frog, though it has four legs, is not classed with quadrupeds, but with reptiles. It is said to be amphibious, which means having "both lives"—one on land and the other in water. In early spring the eggs of the frog may be seen in large clusters in ponds, like transparent beads, with a black dot in the middle, and in April the creature we call a tadpole is hatched from them. At first it is like a tiny fish with gills outside its head, but these soon disappear, and nothing is to be seen but a round body, like a head and stomach in one, and a long tail (Fig. 1). It feeds on the plants which grow

in the water, and especially on the green duckweed which covers the surface of ponds. It has little hooks on its jaws, to enable it to bite the leaves, with a sort of tube or sucker on its lower lip, by which it hangs to floating plants. When the tadpole is about six weeks old, a pair of legs begin to make their appearance near the tail, and by and by another pair come out near the head (Fig. 2), the tail disappears, and the animal is then a young frog. It makes its way out of the pond and begins to live on flies and other living creatures; many other changes having come about in its body, which enables it to breathe air and digest a different kind of food. As a great many young frogs leave their native ponds at the same time, and make their way to fields and gardens, the ground will seem alive with them sometimes, and people have been known to fancy that a shower of frogs had fallen, but it has only been the migration of thousands of them, obeying a natural impulse, and turning their backs on the place of their birth, begin to exercise for the first time their power of leaping and crawling. Frogs have wonderfully strong muscles provided for the movements of their legs, since they have so many different motions to perform with them—swimming, walking, and leaping. Even after a frog has its four legs, it is a great swimmer, and its feet are webbed with skin between the toes, like those of a duck, for after spending the greater part of the year on land, it returns to its pond again, late in autumn, and when winter sets in, buries itself in the mud at the bottom, and remains there in a torpid state until spring returns.



The power of a frog's muscle is shown most in its leaping and hopping, since it can jump into the air as high as twenty times its own height, and at a single leap go the distance of fifty times its own length. The bones and muscles of a frog's hind legs are said to be very like those of a man, but we cannot very well fancy a man being able to perform such a feat in the way of jumping or leaping. The tongue of a frog, which it uses for catching its prey, is very long and narrow, and is placed in its mouth quite differently to that of most animals, hence it is fastened within the front of the lower jaw, with the end lying towards the throat—just the reverse way to that in which our own tongues lie in our mouths. It is also covered with a sticky kind of liquid, to which the flies, as they are caught, adhere, and not being able to escape, are drawn into the frog's large mouth and sent down the throat. Watch as we may, however, it is almost impossible to see the tongue of a frog as he is fly-catching, so rapid is its motion.

Frogs grow very slowly and live very long. They are nearly related to toads, who pass through the same changes in their lives, and are amphibious, or "both-lived." A toad can be known by the

small bumps on its skin, and by its crawling instead of leap. There have been plenty of people, who though they might not, perhaps, have found beauty in them, yet liked to make pets of frogs and toads. We have known a family, who had a large pet frog, called "Jacob," who was supposed to be fond of music. When on summer evenings the drawing-room windows were left open, and playing and singing likely to be going on, a "flop" would be heard on the floor, and it would be found that Jacob had come in to listen to the music; and the greatest care was taken that no one trod on him or set the legs of a chair on him, while some kind of supper would be found to suit him before he took his leave. Late in the autumn he and his fellow frogs will have returned to their native ponds, where they spend the winter in the mud at the bottom, and in the following spring have a concert of their own, since frogs at that time of the year send forth their curious croaking, the chorus often beginning in the twilight and continuing far into the night. In America there is a species of frog, whose croaking is not only louder, but also more musical than that of our frogs, so that, as in England we go out sometimes after dark to listen to the nightingales, people there will go out to hear a frog concert.

(To be continued.)

ON GATHERING AND STORING APPLES.



F it were possible to devote sufficient time to the operation, apples ought to be gathered as carefully as peaches; and for the superior sorts for keeping, the extra time thus devoted would be amply compensated by the result. Every apple that is bruised, before it is stored, is essentially injured. It would be well, too, if judgment were exercised in the time that is most suitable for gathering apples of various sorts. Unlike other produce, this fruit is taken from the trees at one period of the season, without any regard to the state of ripeness of the different fruits.

We have found that the fall of the leaf is a good criterion of the right time to gather; experience has taught us, and it is the best guide, though we confess that *accident* led us to trust first to experience. Some years since, having harvested our crop of apples at the usual time, we found upon a tree in the orchard a peck or two hanging after a severe fit of frost and snow, which lasted far into December. We saw that they looked well, but concluded they must be frosted, and could not be worth tasting, much less gathering; however, for the curiosity of the thing, we plucked and ate, and apples so delicious off that tree we never tasted. While the bulk of the crop which had been stored six weeks had become yellow, mealy, and wrinkled, these were green, full, rich, juicy, and with all that freshness of flavour which only a newly-gathered apple possesses. We resolved to leave our crops much longer in future, and have never deviated from the practice since.

It is considered a good plan to gather pears before they are ripe, but experience has taught us that an error may be committed by attending to this opinion. The produce of some young trees, raised by the late President of the Horticultural Society, were left during the last autumn, until all the leaves had fallen from the boughs, and were then stored. They were in fine condition at the end of January. There are many methods of keeping apples, and very various, which, we suppose, proves that one is not to be preferred to another. Certain it is that we ourselves have made trial of every one, and much trouble and pains have been taken in order to ascertain the best. As very frequently happens, the simplest plan is found to be the most available—namely, to exercise care in gathering; *that* is indispensable, to insure them from being bruised. They should be laid on a clean barn floor in heaps for a few days, then packed in barrels, chests, etc., being put in one by one; thus enabling the person employed to select all that may be in the slightest degree bruised or otherwise damaged or defective; all such should be put aside, and placed in a hamper, etc., to be first used. The main store ought to be now covered over with a wooden cover, and be placed in a cool place; and on the approach of frost they should be removed to a safe situation.

Once in the course of the season it is requisite to look them over; but not more frequently. We have, in former years, taken infinite pains with our stock of winter fruit, but the results have never been commensurate with the trouble.

So much care is requisite to prevent bruising, that the less it is handled the better. Almost every material in which apples are packed will communicate an unpleasant flavour—straw, however clean; sand, however dry, however fresh; hay, however sweet—and for this obvious reason, if no other—these adjuncts themselves alter by time, and decay. Hence we give the preference to simple, careful packing, and always find the plan superior to any other.

THE PREPARATION OF SOILS AND COMPOSTS.

INCE the use of manure in a liquid state has become so very fashionable among both professional and amateur cultivators, it is doubtful whether too little attention has not been paid to the use of proper soils and composts; for though manure, in the liquid state, is a convenient and excellent aid, it is quite certain that a properly prepared compost, as containing all the ingredients which a plant can require from the soil, is the best to be used. According to old rules, or, indeed, to practices of the present time, composts consist of various ingredients mixed together in the prepared or decomposed state, as mellow loam, leaf-mould, rotten dung, etc.

These, though good and healthy, except in special cases, are not calculated to induce luxuriant growth; for the manure of old hot-

beds, the kind generally used is not rich, neither is the soil from old commons, which is generally preferred. Now, in the growth of plants, more especially for the purposes of exhibition, it is customary to limit the size of the pots for certain kinds of plants, and hence those who aim at high cultivation have to seek in rich compost what the plants, under other circumstances, would find in a quantity of soil; in fact, they endeavour to concentrate, in a given space, the fertility of a larger volume of material.

Without entering into the rationale of the subject, it is well-known that annual and soft-wooded plants require more manure than shrubs and trees, and hence, to get the greatest quantity of nourishment into the smallest space, without, at the same time making the soil or compost unhealthy, is a secret worth knowing.

Although much has been written in favour of guano, superphosphate of lime, and other manures, we never use them. In the stable, the cow-shed, and sheep-walk, all that is required for horticultural purposes may be found, and hence no risk need be run of this being too strong, or that too weak. If it were given as a problem, "What is the best compost to prepare for the general cultivation of soft-wooded plants?" the following would be our answer:—Procure from a suitable place two cart-loads of rich loam with the turf on, and as free from oxide of iron as possible; then get from the nearest stable, where the horses are highly fed, a large cart-load of dung, selecting that which has been thoroughly soaked with urine—for it must be recollected the urine carries off the soluble salts of the food of the animal, and the excreta the mineral, and hence it is very important that both should be had. When you have got the loam and manure home, place each in a separate heap, three or four yards apart, shaking the manure out, and mixing it together just the same as you would to prepare it for a hot-bed, only do not allow it to heat too violently; to prevent which it will be necessary to shake it out every three or four days; in a fortnight it will be fit for use; then commence, as you would to form a hot-bed, by marking out the ground, say six feet long and four feet wide, and upon this place a layer of the hot dung nine inches deep, and then a layer of loam, and so proceed, reserving a good layer of loam for the top, until all is used. In forming the bed, beat the manure firmly as you proceed, but leave the loam loose, and square the work up properly at the last. Then place over the heap loose litter to the thickness of twelve or eighteen inches, and cover the whole with mats closely pegged down; the object being to excite fermentation, and to prevent the escape of the ammonia and other essential gases.

The heat may remain in this state for a fortnight or three weeks, or until the heat begins to decline, then turn it over, taking care to throw the side into the middle, and to mix the loam and dung thoroughly throughout. The covering must be again put on as before, and remain on until fermentation has almost ceased. Here, then, we have a compost as rich as the manure it is formed of; but it is so strong that great caution must be exercised in its use, or injury will be the result. To prepare it, however, lay it out in thin rows, fork it over once a week to expose it to the ameliorating

influence of the weather, but protect it from drenching rains, which would soon wash all the nutriment away. After being exposed for a few weeks to the full air, the outsides of the ridges will be fit for use; but if it could be exposed for twelve months before using, it would be all the better. Except for very strong-growing plants, this soil is too strong for general purposes, and hence—more especially, when used in a fresh state—a portion, say one-third, of fresh loam should be mixed with it.

The above is a compost which we can recommend for soft-wooded plants of all kinds, and in it, when properly prepared, plants may be grown stronger and more healthy in three-inch pots than they are generally seen in pots of double the size. Nurserymen would do well to pay more attention to this subject, as they frequently put their patrons to the expense of carriage of large pots when the smaller ones would do. This, or soil similarly constituted, forms the staple in which the magnificent pelargoniums, fuchsias, calceolarias, roses, etc., seen at the London exhibitions, are grown, and its strength accounts for the wondrous growth attained in such small pots.

The spring is the best time to prepare such compost, keeping it turned weekly throughout the summer; but a good stock should always be kept, so that it may be properly sweetened before using.

THE CANNA TRIBE AS BEDDING-PLANTS.



THE culture of this tribe of plants for bedding-purposes is at once so simple, and attended with so little trouble, as to deserve the attention of every one who has space to spare for them. Their appearance, in suitable situations, is magnificent in the extreme; and planted in beds on a lawn, they impart an exotic character which no other plant that I know of can be employed to produce. Last season I succeeded in producing a very fine effect by planting six plants of *Canna gigantea*, at two yards apart, through a large bed of scarlet geraniums, which, from being situated on level ground, and in a conspicuous situation from several points, required something to break the monotony of the bed in that particular place. This arrangement was much admired, and not without reason—for the splendid foliage and bright flowers, waving gracefully about with every gust of wind, imparted an effect at once lively and unique. Our plan is to take up the plants when the frost has cut them down in the autumn, and to pot them in eight-inch pots, and place them under the stage of a greenhouse, or the back part of a conservatory, keeping them nearly dry until the first week in February, when they are placed in an early vinery, and watered freely until they have made a tolerable growth. We then begin to inure them gradually to a lower temperature by transferring them to the greenhouse, then to cold pits, and finally to the open air; and in the last

week in May, or the first in June, we plant them in beds previously trenched and enriched with good strong decomposed manure. We give them abundance of water when they are planted, and afterwards treat them occasionally to a copious soaking of liquid manure. For the outsides of the beds we use *Canna coccinea*, which grows two feet; the next range is *C. patens*, from three to four feet; and in the centre *C. gigantea*, four to six feet.

THE PRESERVATION OF POTATOES.

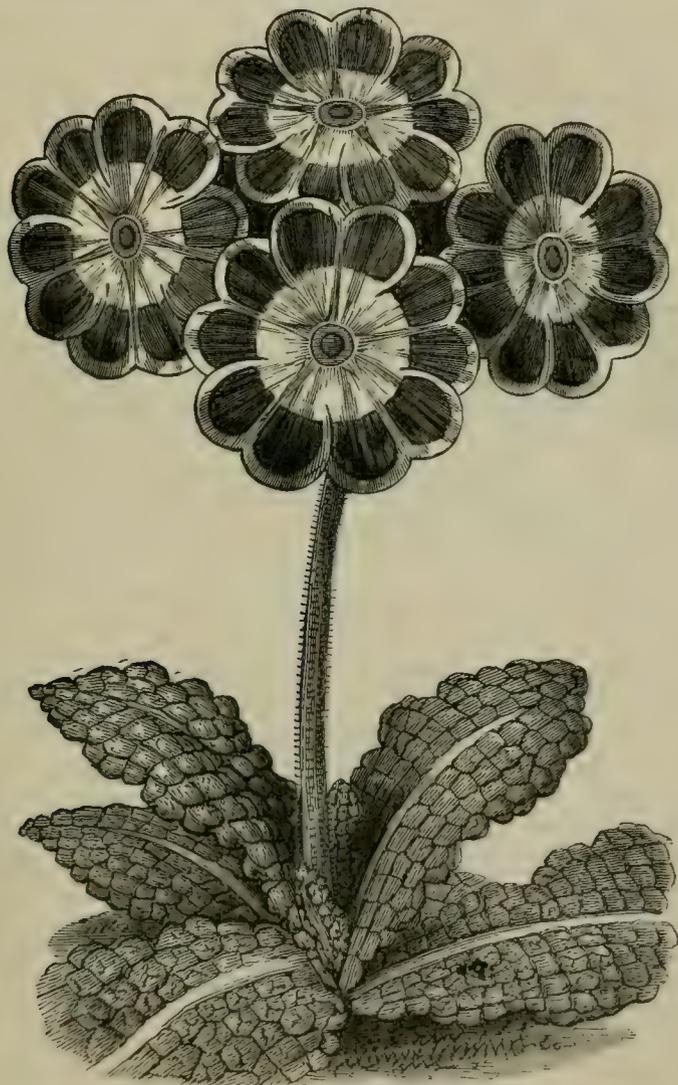


THE methods ordinarily employed for the preservation of potatoes, though good in themselves, are often inefficiently carried out, owing to the absence of an intelligent appreciation of their intended mode of action, and so it happens that their success or non-success is frequently a mere matter of chance, when a moment's thought would have insured a favourable result. In storing potatoes, either for seed or for culinary purposes, the main object in view is to prevent their germination, so that it may not be necessary to pick out the budding eyes, a process which invariably induces a rapid deterioration in quality and strength. The ordinary plan of storing them in cellars is at once good and bad: good, because the atmosphere of such places is usually somewhat damp, so that the tubers do not so soon lose by evaporation the water that is naturally present in them; bad, because the cellars are, for the most part, kept constantly closed, so that occasionally the temperature rises considerably and induces the very evil we wish to avoid, namely, the sprouting out of the buds. To prevent this, the store-place should be wholesome, dry, and *freely ventilated*. In extremely cold weather the temperature must be raised by artificial means, but an excess of warmth is to be carefully guarded against; it is sufficient to keep the temperature just above freezing-point, the arrival of which may be proved, in the absence of a thermometer, by the appearance of ice on a shallow pan of water purposely kept in the store-place. These measures suffice in the case of potatoes intended for planting out; but where they are required for domestic consumption, the further precaution must be taken of shielding them from the action of light. If this be not done, the tubers are apt to turn green, a change which is nothing to their detriment for seeding purposes, but which is attended by chemical alterations that give them a bitter taste, and quite spoils them for domestic use. By attention to these points, old potatoes may be preserved in good palatable condition up to the middle of June, or sometimes to the middle of July.

THE POLYANTHUS.



DEEP, rich, moist loam, and a partially shaded position, are conditions favourable to this charming flower. The heat of summer tries it much, unless it enjoys some amount of shade and regular supplies of water. As a border plant it is of the easiest growth imaginable. It may be planted at any time, if the plants are in pots; but if taken



up from the open ground, the best time is immediately after the fierce heat of summer has begun to decline, and before autumnal frosts set in. To obtain a stock of named sorts, divide and replant in August. To raise seedling plants, sow in summer, as soon as ripe, or early in March; and in either case grow the plants in a

September.

frame until large enough to plant out. Self-sown seedlings occur abundantly in the border where plants have flowered, and may be planted out in September or October. It is an important matter, in managing the seed-pans, not to allow the soil to become dry, for that is fatal to the germination of the seed. The varieties most prized are those with laced borders, the ground colour being dark crimson, maroon, or black, and the lacing consisting of regular marginal bands of various shades of yellow or orange. The named varieties grown in pots for exhibition are of this class. The "giant" polyanthuses are the most showy for the border and the parterre, being of all colours, and in many cases most beautiful. The following distinct varieties are particularly desirable:—*Double Yellow*, *Hose-in-Hose*, *Double White*, and *Golden Plover*.

THE CHRYSANTHEMUM.



THIS fine autumn plant is now an object of some solicitude on the part of the villa gardener. The chrysanthemum fittingly closes the list of what may be termed leading flowers, and that the weather may remain mild enough to allow of the plants blooming in all the fulness and perfection of their beauty, is an ardent desire on the part of all villa gardeners. If the chrysanthemums are growing against the wall—and they should occupy a south or west wall for the sake of getting all the sunshine they can—it is an easy matter to give the plants some protection by night. A neighbour of ours, who loves the chrysanthemum dearly, and yet by reason of the absence of glass is obliged to grow his plants in the open ground, has made a permanent plantation of them against a six-foot back wall. In front of the wall is a border some three feet in width, and at this season of the year this is made a pleasant chrysanthemum garden. The plants against the wall, being treated liberally, make a vigorous growth, and the shoots are kept fastened to lengths of galvanized iron wire running the length of the wall, just as they are set up for training fruit-trees. As the cultivator does a little in the way of exhibiting, it is obvious that, to have clean flowers, there must be protection from rain, etc., as well as from frost. For this purpose he has a movable wooden framework, in the form of a slight sloping roof, raised a foot from the wall at the back, but so constructed as to rest upon the wall, and in the front to uprights placed in the ground. It is about thirty feet in length, and of homely construction; and it can be placed in position or removed with but little labour and difficulty. The top is covered with a thin oiled canvas, which gives plenty of light, and effectually prevents any rain from falling on the flowers. Air can be given at pleasure, if needed, at the top of the wall along the back. The front is open to all the sunny influences that can be obtained; and, in case of heavy frost or cold winds, a covering of tiffany can be placed along the front.

THE GARDEN GUIDE FOR SEPTEMBER.

THE FLOWER GARDEN.



LL border plants of questionable hardiness, or that are of high value, should be taken up and potted, to keep over winter in frames, where they are more safe from the attacks of slugs and snails, and from liability to suffer by damp. Pot off rooted layers of carnations and picotees, and rooted offsets of auriculas, to get them strong before winter. Continue to propagate bedding plants, and get struck cuttings into small pots for the winter. Calceolarias should be struck in quantities, in shallow pans, in a compost of leaf-mould, peat, and sand, and to be kept in the pans till early spring. Get tender plants under glass in good time, but give plenty of air. Sow hardy annuals on firm ground, to stand the winter, for early bloom next season. Gather seeds of all kinds, as soon as ripe. Plant the first crop of hyacinths, tulips, and daffodils, which bloom stronger and earlier if grown as soon as the bulbs are obtained.

KITCHEN GARDEN.

Continue to plant out winter greens; many of the smallest plants left in seed-beds will now be strong, and will be useful early in spring, when the main crops are exhausted. Thin winter spinach to three inches apart, to be thinned again to six inches; but it is better to thin twice, in case of gaps occurring through attacks of wire-worm. Winter spinach may still be sown, but it is getting late for it. Prick out cauliflowers, either in a bed, made so as to be covered with a frame, or into patches, to be covered with hand-lights. They should be four inches apart. Continue to sow saladings, and the last succession of lettuce, choosing for the purpose the hardiest sorts. Take up potatoes as soon as the haulm decays; take up carrots and beet-root as wanted, but the main crops, for storing, may remain in the ground till next month. Parsnips may be left in the ground all winter, or taken up and stored, if the plot is wanted for winter greens. Onions should be drawn, and laid in the sun to harden. Any that are thick in the necks should be broken over close to the ground, and left awhile to induce them to ripen their bulbs.

FRUIT GARDEN.

Gather very carefully all fruit sufficiently ripe for storing. Put the bruised and damaged aside for immediate use, and store only those that are without bruises or damage of vermin. Gather in dry weather, and during sunshine.

GREENHOUSE AND STOVE.

Put into the most sunny spots all hard-wooded plants that require to be well ripened before housing, and if heavy rains set in, cover them with a spare light. Get cinerarias and primulas for early blooming into the house, but give plenty of light and air, to induce a robust habit in the stock. Pines must be kept growing vigorously, by means of a humid atmosphere and plenty of manure-water. Remove the shading from the pits. In vineries, shade the fruit intended to hang any length of time. Vines fruited early will now be disposed to break; do not hurry them, but when they start of their own accord, which they will do after a regular course of early forcing, encourage them with a temperature of about 55° to 60° bottom-heat; for pines in growth, 84°.

TO CORRESPONDENTS.

HARDY PERENNIALS.—*W. Y., Ossington.*—It is almost too late now to raise perennials for next year to have them strong; but hollyhocks, wall-flowers, sweet-williams, antirrhinums, phloxes, silenes, arabis, alyssum, aquilegias, perennial poppies, perennial asters, aubrietias, daisies, perennial valerian, campanulas, centaurea, cistus, delphinium, dianthus, eschscholtzias, hardy gaillardias, perennial

September.

Jupins, forget-me-nots, pentstemons, potentillas, saxifrages, veronicas, and violas, may still be sown, and will have the best chance if in pots and kept in frames all the winter. If sown in the open ground, a dry slope would be the best place, and some seed should be saved to be sown early next spring, and the majority will bloom the same season.

ROSES.—*C. Brown*.—To turn roses out of a greenhouse into such a bed as you describe would be a very likely way of losing them altogether. They should be wintered in a brick pit or well-protected frame. A preservative bed is only adapted for things that are nearly hardy, or at least to keep tender things in till the turn of the year. It is, in fact, a mere contrivance, to be resorted to in a case of difficulty, when the stock of potted plants exceeds the accommodation under regular glass structures.

MULCH FOR ROSES.—*Ignoramus*.—Any manurial matters that are of a solvent nature, and not unsightly when laid on the surface, will answer the purpose. Two or three inches of fresh pig's dung, or short stable manure only half-rotted, are the dressings generally most accessible, and nothing can be better. It is of little use to mulch roses with well-rotted manure, because it is only what washes down by the rain that feeds the roots, and the stuff should be tolerably fresh and strong, to convert every shower into liquid manure in passing through it to the roots. It should be remembered that mulching not only feeds by manuring the roots, but also keeps the soil moist—an object sometimes of much importance, especially in dry seasons. The best time for mulching roses is either in the depth of winter or early in the spring.

CROCUSES.—*E. W. P.*—Crocuses may be lifted when in flower in order to get them into harmonious arrangements, or to remove any of the wrong colour that may have got mixed with the clumps. The best bloom is obtained by taking up and planting every year. They should be planted four inches deep, and one inch and a half apart. Where the planter has the convenience, they may be planted in clumps in a reserve ground, lifted in clumps when in bloom, lifted again when the bloom is over, and the bulbs ripened in the reserve ground. This applies either to old clumps, which would be improved by it, or new ones, which would not be harmed. Of course they must be lifted with care, so as to avoid injury to the roots; rough handling would be very injurious.

BERBERIS JAPONICA.—*Minnie*.—Berberis Japonica will grow in company with any of our hardy evergreen shrubs. It would be a handsome thing anywhere, even in a poor soil and an exposed situation, because quite hardy and not over particular as to soil. But as its great leaves are apt to be injured by storms, and as those leaves grow to double the dimensions in a rich sandy moist soil to what they attain in a poor soil, we should advise for it, shelter, shade, and a prepared compost. Turf from a sandy road-side, chopped up with rotten dung, will grow to perfection.

ASPARAGUS.—*Constant Reader*.—It is an expenditure of force to allow the flower-stems of asparagus to ripen their seed. We always snap the flower-stems through near the root, and leave them till they perish, and then cut them clean away.

WOOD-LICE.—*C. H.*—Cut a few windfall apples, put the slices under flower-pots in the frames and pits, and every morning lift them up and kill the vermin. Slices of boiled potatoes will do, or little heaps of brewer's grains.

ROSE FENCE.—*T. E. P.*—You had best have common China, of at least three years old, and plant them in November next; on your rockery they would do better than any hybrid perpetual; otherwise, Jules Margottin or Charles Duval would be grander and of rapid growth.

CHALK SOIL.—*Beginner*.—By all means avoid American and heath plants, which detest chalk. It takes time to create a surface soil on such a bottom, but it may be done; and the way to do it is to economize every scrap of material, animal and vegetable, that will rot into mould.

EXPOSED FLOWER-POTS.—*M. C. S.*—We should advise you to protect the pots by inserting them in larger ones, filling the interstices with moss. This method has been tried, and found very effectual. One pot placed within another in this way has been exposed to the blazing sun, and the moisture of the inner pot has very successfully withstood the heat.



SYMPHYANDRA PENDULA.



THE pendulous *Symphyandra* is a native of Mount Caucasus, and was introduced into this country in 1824. It grows about a foot high, and has ornamental white or cream-coloured flowers. It prefers a cool, shady situation, as it will not bear being fully exposed to the sun; the north side of rockwork being a very suitable place. It may be increased either by seed or by dividing the roots in the spring. The genus *Symphyandra* may be recognized by the flowers having five stamens, the filaments of which are dilated at the base, fringed with hair and free, the antlers adhering so as to form a long cylindrical tube. The species are herbaceous perennials, with alternate leaves. The generic name is from *symphis*, to grow together, and *aner*, an antler, in allusion to the combined antlers.

PLANTING BULBS FOR EXHIBITION.



THE soil for nearly every hardy bulb should be one half thoroughly decomposed cow-dung, and half light soil of almost any kind, or, if the dung from an old melon or cucumber-frame be used instead of cow-dung, put only one-third part, or two parts of light soil. If the soil which is at hand be stiff and not light, mix clean sand with it till it is made light, and then use two parts of the mixture to one of the dung; or, if it be cow-dung, to an equal quantity. The compost should be thoroughly mixed, and sifted through a coarse sieve, that would let a small marble pass the wires. Take the pots that are five inches across the mouth for the early tulips, and those six inches across, or even more, for the hyacinths. Having first put a bit of crock over the hole, fill these pots two-thirds of the way up with the compost; press the hyacinths or tulips very gently into this surface, enough only to make them stand even while you fill them up with the soil; and let it be noticed that, if pressed at all hard into the mould, the fibres will not easily enter; but press the bulb upwards, and hyacinths frequently throw themselves nearly out of the pot. But if the soil be soft, and the fibres can enter it freely, the surface of the mould will not be disturbed, although the bulb is but just covered an inch. When bulbs are potted, it is usual to cover them with something. Six inches thickness of old tan or sawdust is commonly used, the pots being first plunged to the rim. We, however, do not attach so much importance to this part of the operation as some do, principally because, having generally bloomed large collections without taking that trouble, and found them much better than most other people's, we have of late years omitted that troublesome job. We have put ours in the dark—that is, under the front table of the potting-shed, or under

the stage of a greenhouse, not even being particular as to the darkness, and yet not suffering any inconvenience, so far as we could judge. The principal object is to keep the plant from being excited to grow above, until the roots have formed. We have not convinced ourselves of the benefit of darkness in protecting the upper growth; nor does burying them prevent it, because we have seen the shoots two or three inches long when taken up from their tan or sawdust bed. All we care about is putting them out of our way in a cool place for a time; and whether dark or light does not trouble us. According to the time you wish them to be in bloom, so you remove them to a warmer berth. One season, we plunged our pots into the ground in an open bed, and had as fine a bloom as ever, with only the precaution of keeping the sun off, that they might not be urged into flower till we required them. When they once begin to grow, they require a liberal supply of water; and as we approach the showing time, we may hasten them, if necessary, by the removal to the greenhouse or stove; and as the early tulips ought to be in perfection at the same time, we must regulate by putting the most backward into a little warmth. The object is strength and dwarfiness, which can be best secured by light and air; consequently, those grown in the open air will be the finest and least drawn. If grown under glass, the nearer they are kept to the glass the better, and a frame or pit is far better than a greenhouse. Narcissus requires the same care and treatment, and the same soil. Although there may be some difference in the season of bloom of these things, when all are allowed their own way, we can, by sheltering the forwardest, or even warming the most backward, easily bring them all in together. Those who intend, therefore, to compete with bulbs, should *buy early*, and *of a respectable house*—avoid auctions, above all modes of buying. We know that when the respectable London orders are made up, the refuse bulbs are bought up by jobbers, who make up for the London auctions; and the finest-looking roots, that any novice would admire, may be, and often are, unsound. We are, therefore, never safe without buying of respectable dealers.

With regard to the proper sorts, the dealer will be the best judge, and, more or less, we must trust to his honour. Let him know the colours you want, and the season you wish them to bloom—for some hyacinths and tulips are nearly a month earlier than others—pay him the price, and you may calculate on a successful issue. Go to a sale, and it is a chance if you have a bloom at all; but it is a certainty that you have not a good one. When the flowers begin to show their colours, shelter them from the mid-day sun, but do not exclude light; the most flimsy shade will do to prevent burning.

POMPONE CHRYSANTHEMUMS.



AS the rose is the admitted queen of summer, and the dahlia the autumn king, so may the chrysanthemum be ranked as the king of winter; for, coming into bloom just at the season when the autumn monarch succumbs to the terrors of the ice king, it may be said to be the floral connecting link between the old and the new year—like an oasis in the desert, or a star to cheer the florist when all around is drear and dark. Unlike most other plants, the chrysanthemum seems to delight in smoke-pent cities; for, within a stone's-throw of Fleet Street, in the Temple Gardens, abutting upon the Middlesex side of the river Thames, may be seen, every autumn, a display of this flower, which for effect rivals the American nurseries of Bagshot, or the grand display of these plants at Chiswick and the Regent's Park. Our attention was first directed to these gardens one thick November morning, when the fog being of true London character, we landed at Paul's Wharf, and wended our way westward through Thames Street, Whitefriars, and the Temple, where, through the aid of a sudden gleam of sunshine, we descried, amid the yellow mist, a grand display of this splendid flower. At the first sight we thought they must have been transplanted from some suburban nursery or garden, but a closer inspection satisfied us that they were veritable productions of the place. In Lincoln's Inn Fields, also, the chrysanthemum flourishes, and would do so more fully if more attention were devoted to its management; and in most of the squares a few straggling plants may be seen, amply testifying that, if properly managed, they would make London gay even when the country is cheerless; for they are less likely to be injured by frost in London than in the suburbs.

With these facts before us, it is in the nature of things that chrysanthemums should be rising in public favour; and the gorgeous specimens which have been produced, not only of plants, but of cut flowers also, at the Stoke Newington and South London, at the Horns Tavern, Kennington, and other exhibitions, prove that the chrysanthemum, as a florists' flower, will become as popular as the rose, the dahlia, and the hollyhock.

Among the novelties lately brought into notice are the varieties which belong to the class of pompones, or small varieties, which have originated from the Chusan Daisy (a variety introduced by Mr. Fortune from China) and the ordinary kinds. These varieties are specially remarkable to the hybridizer, as having taken on, in crossing, the varied colours of the large kinds, without increasing in size; for though some of these are larger than the Chusan Daisy, the majority scarcely exceed it in size; and some of them are even smaller. In form, also, several of the varieties are nearly perfect, while one of them, called *La Nain Bébé*, when the flowers are fresh, has the scent of violets! The plants in habit are mostly compact and shrubby, but some of them are a little inclined to become tall. Most of the varieties flower very freely, and therefore are likely to

become very useful plants for bedding out in the flower garden for a winter's display; hence we shall address ourselves to their treatment for that purpose, in the present notice, and leave the subject of their cultivation for exhibition till a more suitable time.

Premising, then, that you have supplied yourself with a stock of plants of each of the varieties, which you are desirous of getting a quantity of for flower garden purposes, place them at once in a warm greenhouse or pit, at a temperature of 45° to 55° , and as fast as they produce cuttings of sufficient length, take them off, and strike them in the propagating pit or a close frame. Continue that practice until you have a sufficient number of each kind, and pot the cuttings off as they get well rooted; but bring them up hardy, and keep them as dwarf as possible. The young plants, after they are established in small pots, may be protected under temporary frames until they are planted out in June. Having provided a sufficient number of plants, the next step will be to prepare the ground; and this should be rather strong and well enriched, so that the plants may be taken up with good balls. Now, if large specimens are wanted, averaging say eighteen inches in height, and the same in diameter, the plants must be put out in rows three feet apart, the plants standing two feet apart in the rows; but if smaller plants will suffice, then you may take the cuttings in June, and after rooting them in a close frame, plant them out direct from the cutting pots, taking advantage of dull, showery weather, and just sticking them in with a dibble, as you would a lot of cabbage plants. These young plants will not require so much room; and hence, if they stand eighteen inches apart each way, that will be sufficient. As soon as they are established, and begin to grow freely, go over them not later than the middle of July, and stop each plant by cutting the head off within a few inches of the ground: this will cause them to branch, and to become dwarf and very compact plants. If the larger plants are put out, they will require the same treatment as to cutting back, or they may be allowed to grow on, and have the points of the shoots layered the first week in August, by which means they will form very dwarf and compact plants for potting. One thing, however, must not be forgotten, and that is, that these small varieties must never be stopped later than July, or the probability is that they will not flower. Through the summer and autumn, the only care the plants will require will be to keep the ground clear from weeds, and deeply hoed occasionally; to water the plants in dry weather, giving them, when necessary, a thorough soaking, and to protect them, by timely tying and staking, from being broken by the wind. Towards the end of August, if the plants continue to grow strongly, go along each row on one side, and with a spade cut the roots to within three or four inches of the stem; then, in about a fortnight, go along the other side, and cut the roots in the same way; and, if necessary, a third or fourth time. This will check the growth of the plants, and, by ripening the wood, induce and promote the blooming principle. Chrysanthemums, to bloom them properly, should not be planted upon a cold soil, as the buds are found to come blind, hard-eyed, and otherwise deformed:

therefore in cold situations it will be found advisable to grow the plants upon a south border, or to remove them to other situations at the end of September. They will not receive much check if they are shaded afterwards, and receive a good drenching or two of water.

Now, the time for removing the plants to the flower-garden must, of course, depend upon circumstances; but the sooner they are in the beds in which they are to bloom, after the end of September, the better. Before moving them, take care to give the beds in which they are to bloom a good dunging; and if fresh, so as to ferment a little after the plants are planted, it will be more beneficial to them. After planting, give a good soaking of water, and, if necessary, shade the plants in the middle of the day. So far we have said nothing about protection; but, should the weather prove severe, a little protection will be necessary. We should, therefore, recommend a few neat iron or hazel hoops to be thrown over the beds, over which mats or waterproof covering could be placed at night. So managed, we have no doubt the plants would bloom splendidly, and the beds be gay until the close of the year.

WATER SCENERY.



THE Romans delighted in their fish-ponds not so much as ornaments as preserves for epicurean delicacies. The lampreys were their water-gods, which, as in the case of Hortensius, they alternately petted and adored, and to whom they now and then sacrificed a human victim, not to appease the anger of the deities, but to satisfy their appetites, and improve them for the table. Our English fish-ponds and aquaria bring suggestions of a more domesticating character, in unison with our national feeling and love of rural elegance. Water is the life and soul of a garden, whether on the ground-plot of a suburban cottage, or the embellished lawn of an extensive villa. It can be rendered appropriate to any style of gardening, and is equally adaptable to the classic refinement of Italian terraces and gay parterres, as to the shrubby umbrage of a rustic wilderness.

We will venture to say that water is rarely used to such an extent as it might be, and should be, in English gardens. Frequently the abundant supplies of water on an estate are looked upon as a calamity; the owner frets himself to find outlets, the legislature comes to the rescue with a drainage act; and oftentimes when the drainage has been effectually diverted away from the place, it is discovered that it might have been put to better use than to swell the woodland rivulets and add to the volume of a stream which contributes to the wealth of lands miles away by means of many such contributions. We call to mind a property we were engaged to lay out not many years since, and where we were permitted to indulge our taste freely in forming a beautiful scene. While scheming to carry water away from the land, and carrying out great drainage

works for that purpose, the engineers were at work on the highest part of the ground boring an artesian well. Every one to his trade, the landscapist must drain, the engineer must bore, bore; one is getting rid of the very element the other seeks, and the proprietor who pays for the work simply occupies the position of a means of separation between agents who ought to work together, and according to one plan, from the first. It is true that land needing drainage must be drained; it is true that water stagnating in the soil is like so much poison; but having once persuaded that water to move in channels provided for it, having guided it into small pipes, and thence into large mains, and thence into lakes, ponds, and outlets, ought we to dismiss it at the boundary, lose it for ever, while the domestics are perhaps crying out against the scanty water supply, and the proprietor contemplates sinking another well in hopes of the second being less intermittent than the first? Generally speaking, the economy of country houses in respect of water may be likened to the act of a farmer who should pay fifty shillings a quarter for imported wheat, and, at the same time, give the produce of his own farm to the fowls of the air, and yet, after all, should persevere in growing wheat, that he might continue to waste it in the same manner.

It is said that all possible ranks of industry are filled up, which is equivalent to saying that human invention is exhausted. Having made this quite superficial remark on the paradoxical management of water on landed properties, it must be further remarked that there is ample room and verge enough for any thoroughly competent and ingenious person to make a fortune by the establishment in country houses of economical water works. In many private houses small gas works are in operation, but there are many substitutes for gas, and there is no substitute for water. When you have a great supply of water by surface drainage, the only question of its conversion to tank water for domestic purposes is one of pure mechanism, and a mere beginner in engineering could devise plans for the appropriation of every drop at such a comparatively low rate of cost as should, in many instances, render well-sinking and boring most ridiculous.

Let us suppose a property to be completely drained, it is a mechanical matter to collect the water somewhere; a mechanical matter to take it from thence by means of the hydraulic ram to any other higher level if there is anywhere near a moderate fall, whether natural or artificial. Even the water used to afford mechanical power to the ram need not be wasted; and, having got a ram to work, the water may as well be carried to the top of a house or the top of a hill or tower, as to any level midway between such extremes. The next business is to make this water subservient to utility and ornament at one and the same time. The quantity which can be kept flowing, and the volume of the reserve, on which the works will have to rely during a long drought, must to some extent determine the nature of the ornamental purpose to which the water may be applied; it may sometimes furnish a cascade, and send silvery spray through a rocky glen clothed with myriads of mosses and ferns, or furnish a little spring or fountain to splash over a stone

into a nook full of freshness, and thence flow to the lake again, or to fill the tanks which supply the garden.

And, me before, I saw a little well
That had his course, as I could well behold,
Under a hill, with quick streamis and cold.

The gravel goldn ; the water pure as glass,
The bankis round the well environing,
And soft as velvet was the younge grass
That thereupon hastily came springing.
The suit of trees, abouten compassing,
Their shadow cast closing the well around,
And all the herbis growing on the ground.

It must never be forgotten that the disposal of water-scenes demands the exercise of great taste and judgment. Water of itself is always beautiful, but its association with objects of interest enhances its beauty, and supplies also the justification of usefulness. Where the space and circumstances admit, water should always be enriched by plantations ; clumps of trees, rustic buildings, rockeries, and belts of shrub are appropriate accessories ; but they must be adapted in style to other surroundings, and the general character of the place ; and there is a certain point at which to stop in the work of embellishment, or the whole affair may be overdone. Architectural fountains and the accessories of terrace water-works may be complicated and elaborate, but whenever water is allowed to expand to show its gleaming surface beside green turf and trees there must be *breadth* ; the eye must be free to range in some one direction over lawns or other open spaces, in order to render the thickening of sylvan scenes and the confusion of bush and brake the more agreeable where the water is conducted away from the dressed grounds and made subservient to true rusticity. What a charm would be imparted to many a garden where a still pool, "mantled o'er with green," reproaches the proprietor with neglect, by the introduction of a clump of trees and a garden-house, or by the appropriation of one bank to a bee-shed looking south, and a summer retreat in the rear, facing in the opposite direction, where the bees would neither harm nor alarm anybody. Picturesque objects in the vicinity of the water double themselves on its surface, and the shadows and reflections are alone sufficient compensation for the cost of the work when the arranging and grouping have been managed with taste.

Water may be introduced in any part of a garden or wilderness ; but the *way* in which it is done must be determined by the nature of the locality. Suppose the possessor of a garden wishes for water at the summit of a hill, then if he would have a pond or a lake, the chances are in favour of the affair becoming a source of merriment to critics of landscape. But a bubbling fountain would be very appropriate to the top of a hill ; and not long since we sat beside a crystal spring on the brow of a heathy eminence at Oakshott, in Surrey, and counted the species of plants the water had coaxed there. Natural springs frequently emerge on high grounds, and in a grand garden the charm of a fountain on the side or summit of a hill may

be made quite appropriate, even if the water supply for it has to be secured by artificial appliances, such as the working of a ram at some distance off, and the conveyance of water to the spot by pipes under ground. Once get the water up there, provide a stone receptacle for it, and lead away all overflow in the form of a rivulet, and nature will soon plant the margins of the fountain and the rill with curious wild flowers, and the birds of the district will make the spot a favourite haunt for bathing, drinking, courting, and of course for morning and evening concerts. The fountain on the hill at Oakshott flows over a rough oak cistern, fixed there by the villagers to preserve a depth of water for dipping. It is almost hemmed in on three sides with tangled vegetation, most of it lovely and rare, and the shallow rivulet it makes in its course down the hill is completely matted with sundew, lichen, lycopodium, scutellaria, bog pimpnel, and other of the choicest vegetation of heathy bogs. If it could be transferred with all its accessories to some great garden, it would be considered one of its choicest features, and perhaps attract more visitors than it might be convenient to admit gratuitously. One who would have water at the top of a favourite mound must be content with a rustic fountain, and indulge fancy to any extent to make it grotesque, picturesque, or severely simple.

In the main walk water is equally admissible, but then we must have an architectural fountain or basin. The style of the house, the terrace, and the grounds must determine the style of the fountain. If the house is a very plain edifice, and the grounds would need to be described as "neat" rather than "grand," we should prefer a plain stone moulding, a few graceful curves, and trust more for effect to the sparkle of the water and the grace of the accompanying vegetation than to sculpture or fanciful rockeries. A fountain in a main path, within view of the drawing-room windows, or readily accessible from the house by a short walk, should certainly present itself to the eye in a very distinct form, and should constitute a feature in the scene. If so small as to be invisible until the visitor almost tumbled into it, and so mean in character as to have no more dignity than belongs to an accidental detail, every person of cultivated taste would condemn it as an absurdity. If too grand for the place it would be equally absurd; in fact, if it cannot be well done, as circumstances require, it should not be done at all, for paltry waterworks are more obnoxious than paltry earthworks, and betray more quickly whether lack of means or lack of taste is to be accredited with the failure.

(To be continued.)

WINDOW GARDENING.

BY JOHN R. MOLLISON.

(Continued from page 278.)

PLANT-GROWING IN WARDIAN CASES.



THE Wardian case is one of the great inventions of modern times, called forth by our increasing love for flowering plants and ferns, and a very good illustration in itself of the height of perfection to which we have arrived in the art of plant-growing. With their aid we can now have a selection of our favourite plants as our daily companions in our rooms, always beside us to be admired and made much of, and the objects of our daily care and attention. Situated thus they become, by-and-by, part and parcel of our very existence, associated with the love of our friends and companions, and ranking among the necessary requirements of our homes. We hail with pleasure the appearance of a fresh bud, and the unfurling of each tiny, tender leaf. Day by day, and week by week, we mark with patient hope the rate of progress every shoot is making, till at last, oh, joy of joys, the flower-bud appears, and ere long displays to our delighted eyes the long hidden charms of rich and gorgeous hues and fairy forms of which we often dreamed. Thus, they weave around the heart a host of tender associations, ever dear to the memory because of the loved ones who may have passed away, or parted from us for awhile, leaving us the remembrance of the busy hands and loving voices that made life so pleasant for us in the past, in helping to tend the pretty flowers now left as a sole remembrance of their once happy presence. Every plant in our home will have its own history, its own pleasant associations. Every bud, leaf, and frond will be dear to us, having watched them forming one by one, and expanding in the light.

The most successful and interesting way for amateur cultivators to grow ferns is by means of the Wardian case. In it they can either be grown in pots or planted out on rockwork. The moist atmosphere and protection they enjoy when grown under glass is the nearest assimilation to their natural requirements to which we can attain. Under a case, if proper care and attention be bestowed on them, they develop their natural graces to a greater extent than when growing in their wild state. Many other plants can be grown in conjunction with them, giving an interesting variety to the general arrangement.

I remember once being sent to rearrange a Wardian case for a lady. Some fresh ferns were to be added, and others shifted into larger pots; but what took my attention more than anything was a luxuriant plant of *Stephanotis floribunda*, the very picture of health, covering the entire roof of the case in many twining folds. The ferns and mosses underneath it seemed to enjoy the shade provided for them by their robust neighbour. I was told the *Stephanotis* had

never once flowered, although it had been in the case for some years. Doubtless the confined space had prevented it setting flower-buds, but it was a beautiful plant, even without flower.

Of the many plants that can be grown with advantage in conjunction with ferns, the *Tradescantia zebrina* is among the very best. It has a low creeping growth, with smallish oval-pointed leaves, which clothe the stem in pairs, each leaf being prettily silver-grey, green, and brown striped, and having small pinkish flowers at their axils. It cannot fail to be a favourite with all who grow it. The *Calla Ethiopica*, with its large handsome green leaves and white trumpet-shaped flowers, makes a grand centre-piece; and the smaller growing *Caladiums*, with their gorgeously coloured leaves, give a charming diversity to the whole arrangement. The feathery palm-like foliage of the *Bambusa* looks very pretty, rising rigidly among the ferns, which they seem to rival in gracefulness. The pretty silver variegated stove grass, *Panicum variegatum*, is another little gem; a little bit planted out in the rockwork soon grows away. A plant of the variegated coltsfoot grass, *Dactylis glomerata*, is a nice companion for it. The *ivy-leaved Geraniums*, green and variegated, and *Lobelias*, and several other plants, all thrive under the same treatment given to ferns and mosses, and help to make up a truly grand case of plants.

All the wild British ferns described in a former paper do well in a Wardian case in your room. The most desirable greenhouse ferns to grow in conjunction with them besides the ones previously described, are the following. The figures following their names do not represent their full natural development, but rather the length they generally attain when under cultivation in a closed glazed case. They are nearly all evergreen.

| | |
|-------------------------------------------|-----------------|
| <i>Acrophorus hispidus</i> | 6 to 12 inches. |
| <i>Adiantum cuneatum</i> | 6 „ 12 „ |
| „ <i>reniforme</i> | 4 „ 8 „ |
| <i>Asplenium flabellifolium</i> | 12 „ 18 „ |
| <i>Blechnum occidentale</i> | 12 „ 18 „ |
| <i>Campyloneuron repens</i> | 5 „ 10 „ |
| <i>Cystopteris bulbifera</i> | 10 „ 12 „ |
| <i>Davallia parvula</i> | 5 „ |
| <i>Lomaria Germanii</i> | 9 „ |
| „ <i>gibba</i> | 6 „ 18 „ |
| <i>Lygodium japonicum</i> (climbing) | |
| <i>Platynerium alicorne</i> | 6 „ 18 „ |
| <i>Woodsia obtusa</i> . | |

The proper position for a Wardian case is where the sun cannot reach it, a few minutes' strong sunshine being enough to shrivel up the tender fronds of the ferns. They should always be kept cool and moist, during the summer especially. This can be done by shading them if the light is strong, and giving them a vapoury sprinkling now and then during the day, and leaving the top of the case loose, so that a gentle circulation of air may be kept up, allowing just a little more ventilation during night hours in summer

time to keep the plants cool. Never have the case altogether closed; always make provision for a gentle circulation of fresh air. A fern should never be allowed to suffer for want of water, but during the winter months, when all plants are comparatively at rest, less moisture and watering will do. As a rule, ferns can hardly be overdone with moisture at the roots all through the growing season, as long as no stagnant water is allowed to lodge about them. You should always make sure, therefore, that the drainage is ample, and in good working order.

The soil most suitable for the rockwork inside the case is the same as recommended for pots; that is, roughly broken peat earth and silver sand in equal parts, with a small proportion of sandy loam added. If you go to any nurseryman he will give you the proper soil you require, if you tell him for what purpose you want it. It is better to do this than to mix up your own compost, and you are sure of getting good soil ready for work at once. When arranging your rockery, make up a heap of this soil and place your burrs, or rocks, in a natural easy style over it. There will be no difficulty in planting your ferns and mosses afterwards; you can just displace a stone to allow of that being done, and replace it again. In this you will have an opportunity of displaying your good taste and skill as a plant-grower. The neater the arrangement, the more credit will accrue to you, and remember that you should never give your ferns manure water, as I recommended for flowering plants; they do not care for it.

The Wardian case can either be placed on a stand or table in your room, on stair landings or in halls and vestibules, or fitted up in a window recess in connection with the lower sash of the window, and treated much in the same way as the miniature greenhouse. There are a great number of lovely plants, not hardy enough to grow in the miniature greenhouse, which can be grown to perfection in a Wardian case, inside your room, where they will have the benefit of the warmth kept up for your own comfort; and one of the great points in favour of a glazed case, is that your plants enjoy a nice moist atmosphere, in the arid temperature of a room, and are completely protected from the poisonous effects of gas, which would quickly destroy them if not enclosed.

A truly grand case of flowering and foliage plants alone can be made up out of the following list. They are all of easy management, and require a soil to grow in composed of nearly equal parts of peat earth, leaf-mould, and turfy loam, with a good proportion of silver sand added: *Allamanda grandiflora*, *A. Schottii*, *Achimenes* of sorts, *Gloxinias* of sorts, *Gesnerias* of sorts, *Gesneria Oxoniensis*, *Hoya bella*, *Kalosanthes* of sorts, *Caladiums* of sorts, and *Begonias* of sorts.

Of serviceable hardy orchids we have *Cypripedium barbatum*, *C. insigne*, *C. venustum*, *Dendrobium nobile*, *Oncidium barbatum*, *O. jlexuosum*, *Trichopilia coccinea*, *Lycaste Skinneri*.

And for climbers we have the lovely *Kennedyas* of sorts, and *Stephanotis floribunda*, and *S. profusa*, a very free-blooming variety for pots. The *Hoya bella* also makes a lovely climber. A very nice

way to raise palms is to sow several stones of the dried dates of shops in a pot inside your plant case. They soon grow and make nice specimen palms in the course of time.

A selection from the above list, with the addition of a geranium or two, a fuchsia, and a pot of lobelia would be a very good arrangement. A case of this kind for flowering and foliage plants requires plenty of air throughout the day, and to be kept nearly close at night, to protect the plants from gas. Airing must always be given from the top of the case, which should be moveable to allow you to lift it up an inch or so at a time. Pot plants, in a case, require plenty of water during the summer season, when they are growing, but during the winter months they should be allowed less, as all plants are then in a passive or resting state, unless when forced unnaturally into growth, by means of heat. The inmates of your plant case should have a sprinkling overhead in the morning before the sun shines on them, with tepid water, and the same in the evening when closing the top.

Of course, as plants grow they will tend to get crowded in the case, and then you should either prune some of your specimens, or take one or two of the hardier sorts out to give room to the rest. It never does to crowd plants either in a case or miniature greenhouse, or when standing in pots in the window. A few plants well-grown are better than a crowded mass of sickly ones.

The bottom of your plant case can be laid with soil and gravel, and *Selaginella denticulata* and other mosses planted over it, which you can arrange in such a way that the flower-pots may be partly hidden. Some of the *Echeverias*, *Sempervivums*, *Sedums*, etc., could also be brought in with advantage; and two or three select ferns, if you wished them, included, would complete the arrangement. The climbers I have noted should be run up the sides and trained along the roof with copper wire; trained in this style they do not interfere much with the plants below, and afford, at the same time, a grateful shade. They will require a good deal of pruning and training as they grow, to keep them from getting too dense. Order and cleanliness are two most essential things for the health and well-being of the plants. They should be watered periodically, and all decaying flowers and foliage removed, and the glass and pots kept quite free of the green vegetation so liable to take place in such structures.

This and the following papers aspire to the higher style of window gardening and floral decoration. I have no doubt that many of my readers will not be able to follow out the suggestions I am giving; still at the same time they may pick up useful hints which they may turn to advantage. It is quite easy if you have the necessary materials to construct a Wardian case for yourself, at considerably less outlay than you would have to make in purchasing the elegant ones sold by the dealers. A neat zinc bottom in the form of a box of the size you wish your case to be, with narrow strips of zinc led up from the corners, and soldered together double, with binders from corner to corner in the same way, and the glass put in between the double strips, and joined closely with putty, would make a very good Wardian case. The glass should be very

thick, and the top fastened with two hinges. The zinc should be painted neatly.

Those of my readers who are able to follow out the suggestions I give in this and the following papers, if they have not given much thought to plant-growing in their rooms before, will soon be as enthusiastic as the keenest old veteran in the art. There is an absorbing interest in this lovely and innocent pursuit that captivates the hearts of young and old.

(To be continued.)

A SELECTION OF FRUIT TREES FOR GENERAL PURPOSES.



IN making the following selection, we have had in view the diversity of circumstances under which cultivators are placed, as to soil, climate, and pecuniary means, and have entered such varieties only, as have been well proved, in districts differing considerably from each other, and which may be obtained of most dealers, at moderate prices. In regard to fruits and vegetables, almost every district has its favourite sort, and these, in many cases, do not prosper equally elsewhere; and among the very best of those which may be termed generally useful, some are more influenced by soil and climate than others, and in some districts will fail altogether. In stocking a garden, it is not only well to refer to lists of noted sorts, but also to take note of those which do well in the locality; and in all cases it would be well to secure the latter, before adding from any general list, because the only safe guide, as to whether this or that variety will succeed, is to try it. Thus, roses are understood to require a fat loam; but no one can say to a certainty, whether the loam of a garden, however suitable it may appear, will grow roses until they have been tried there. In the same way, almost every district has its own particular sort of potato, which experience or custom has sanctioned as most suitable; and of two sorts of equal merit, one will succeed on a soil, where the other would fail altogether. Therefore, we say, take soil and climate into consideration in making your selections, especially of plants that are intended for the open ground. Plants for pot culture are more under our control, and are therefore less influenced by local circumstances. The following varieties of flowers, fruits, and vegetables, are those which combine the highest qualities with a considerable power of adaptiveness, and for that reason we describe them as the best in every sense, and the most likely to answer under the various influences of soil, climate, etc., that their cultivation may be influenced by in various parts of the kingdom. Those to which a * is attached, are recommended for proved excellence. The letters k and d attached to the names of fruits, imply for *kitchen* or *dessert*:—

October.

APPLES.

Alfriston, k, large and heavy ; Ashmead's kernel, d ; Beachamwell seedling, d, delicious flavour ; Beaufin, Norfolk, k, for drying ; Bedfordshire foundling, k ; Codlin, Dutch, k ; Codlin, Manks, k, first-rate ; Codlin, Keswick, k, good bearer, very early ; Court of Wick, d, serviceable ; Court-pendu Plat, d, excellent bearer, blooms very late ; French crab, k, may be kept two years ; Dumelow's seedling, k, acid, juicy, excellent ; Early Harvest, d, rich flavour ; Golden Harvey, d k, exceedingly rich, and very serviceable ; Hawthornden, k, best early bearer ; Hawthornden, k, new, keeps longer than preceding, Leadington, Monstrous, k, extra size ; Lord Suffield* (Turner) ; Margaret (Joanneting), d, early ; Nonesuch, round winter k ; Nonpareil, old, d, deserves a wall ; Nonpareil Pitmaston, d, excellent, brisk, and rich ; Northern Greening, k, keeps well ; Pearmain, Adam's, d, first-rate ; Pearmain Herefordshire, k d ; Pearmain, Mannington's, d, brisk, rich, and sugary, first-rate ; Pippin, Blenheim, k d, first-rate ; Pippin, golden, d, requires a wall, but repays all trouble ; Pippin, gooseberry, k, peculiar flavour ; Pippin, Kerry, d, good bearer ; King of the Pippins, k, very handsome ; Pippin, Ribston, k d, best for any small collection, but apt to canker ; Pippin, Sturmer, k d, brisk flavour, very late ; Pomme Royal, k d, a fine sort, good size ; Stamford Pippin,* d (Wood and Ingram) ; Prince Albert* (Lane), k d, excellent for the kitchen ; Quatford ; Aromatic, d, very rich and aromatic ; Queen Caroline, a showy sort ; Reinette du Canada, k d, best dessert, large fruit ; Reinette, golden, d ; Reinette Van Mon's, d, aromatic ; Russet, Boston, d ; Russet, Brownlees' Seedling, k, beautiful colour ; Russet, Royal, k ; Russet, Syke House, d ; Waltham Abbey seedling, k ; Winter Colman, k ; Yorkshire Greening, k ; esteemed for kitchen use.

CHERRIES.

Belle d'Orleans, d, very early, good forcer ; Bigarreau, d, large and handsome ; Bigarreau Gros Cœur, d, very large ; Black Eagle, d, rich colour and fruit ; Black Heart, Buttner's, d, bears well ; Black Heart, Werder's Early, d, very early ; Downton, d, very rich fruit ; Elton, d, first-rate ; Florence, d, later than Bigarreau ; Late Duke, d, very late as standard ; May Duke, d, best early, forces well ; Morello, k, best forcer for richness and bearing, does well on a north wall.

APRICOTS.

Breda, for preserving, bears well as a standard ; Kaisha, a very sweet luscious fruit ; Moorpark, best for general cultivation ; Royal, ripens before the Moorpark ; Shipley, ten days earlier than Moorpark.

CABBANTS.

Black, Naples, best black ; Red, common, very fine ; Red, Dutch, long bunches ; Red Grape, Myatt's, large berries ; White, Dutch, large bunches and berries ; White, Holland's, best white grown.

GRAPES.

Open air.—Black July, early, black; Buckland's Sweetwater* (Ivery); Chasselas Musqué, or St. Alban's, white; Esperione, first-rate, purple; Frontignan, black; Hamburgh, black; Muscadine (royal), white; Pitmaston, Cluster, white; Sweetwater, white.

Vinery.—Barbarosso,* black, larger and finer than black Hamburgh; Black Prince, black; Frontignan, white; Saint Peter's, black; Tokay, Charlesworth, white.

Hothouse.—Constantia, purple; Bushby's Golden Hamburgh,* yellowish, a first-rate new grape, partaking of the Hamburgh flavour, with yellow berries; Mill Hill Hamburgh, black; West St. Peter's, black; Muscat of Alexandria, white; Muscat, Cannon Hall, white.

GOOSEBERRIES.

White.—Large Early White, very early; Lively Green, good bearer, nearly white; White Eagle, large; Whitesmith, excellent flavour.

Yellow.—Briton, first-rate; Golden Drop, very early; Leader.

Green.—Green Gage, beautiful flavour; Green Orleans; Greenwood, good bearer; Large Late Green, extremely fine variety; Warrington, best late.

Red.—British Queen; Champagne, unequalled richness; Glory of Oldport; Jackson's red, for preserving; Jolly Printer, good bearer; Lancaster Hero, large; Red Frame, good bearer; Rough Red, late, best for preserving; Waterloo, a showy sort; Wonderful, excellent for dessert.

NECTARINES.

Elruge, forces well, end of August; Imperatrice, excellent for forcing; Murray, good flavour, end of August; Newington, prized when shrivelling, middle of September; Newington Early, excellent flavoured, beginning of September; Pitmaston, orange, best yellow-fleshed, end of August; Stanwick, requires warmth, end of August; Tawny (Hubt's) very early, middle and end of August; Violet Hative, best for forcing, end of August.

PEACHES.

Admirable, late, for forcing, September; Admirable (Walberton), forces well, middle of September; Bellegarde, succeeds Royal George, beginning and middle of September; Catherine, best Clingstone, beginning of October; Early Anne, early, beginning, and middle of August; Mignonne Grosse, first-rate for forcing, end of August and beginning of September; Noblesse, best for general purposes, end of August; Pucelle de Malines, very hardy, end of September; Royal Charlotte, forces well, beginning of September; Royal George, first-rate for forcing, end of August; Salway* (Turner), aromatic and juicy, beginning of November; Shanghae, the largest grown, middle of September.

PEARS.

Aston Town, d, bears well as a standard; Bellissime d'Iilver, k, good stower; Bergamotte (Gansell's), d, rich flavour; Bergamotte,

October.

Esperen's, d, hardy ; Beurré d'Amanlis, d, large and melting ; Beurré d'Aremberg, d, hardy as a standard ; Beurré d'Audusson, perfumed fruit ; Beurré Bosc, d, half melting, requires a wall ; Brown Beurré, d, bears abundantly ; Beurré de Capiaumont, d, fine melting ; Beurré de Mons, d, crisp flavour ; Beurré Diel, d, large melting ; Easter Beurré, d, a valuable spring pear ; Beurré Rancé, d, melting, and beautiful ; Beurré Van Mons, d, melting, very rich ; Bon Cretien d'Auch, d, rich, but rather gritty, without heat ; Bon Cretien Fondante, d, cool, refreshing juice ; Bon Cretien Musqué, slightly perfumed ; Bon Cretien (William's), d, requires a warm situation ; Chaumontel, d, buttery, splendid as Pyramid ; Colmar, d, requires a wall ; Crassane, d, requires a warm wall ; Crassane Althorp, d, good as a standard ; Doyenne Gray, d, hardy autumnal ; Van Mons, d, melting ; Duchesse d'Angoulême, d, large and melting ; Dunmore, d, good as a standard ; Eliza* (Matthews), large melting, valuable in the smallest collection ; Forelle, d, melting, speckled like a trout ; Franchipane, k, first-rate for stewing ; Glout Morceau, d, very late, requires a wall ; Incomparable (Hacon's), d, melting ; Inconnue Van Mons, d, melting ; Jargonelle, d, very juicy, early ; Josephine de Malines, d, aromatic flavour ; Louise Bonne of Jersey, d, handsome ; Marie Louise, d, best on a wall, very buttery ; Ne Plus Meuris, d, best, late ; Passe Colmar, d, melting, great bearer ; Saint Denis, d, melting ; Seckel, d, good bearer ; Swan's Egg, d, good bearer ; Thompson, d, very rich ; Uvedale St. Germane, k, largest stewing ; Vicar of Winkfield, d, very large ; Winter Nelis, d, very melting, deserving a wall.

PLUMS.

Ashridge, black, k, first-rate bearer ; Coe's Golden Drop, d k, excellent as standard ; Coe's Late Red, d ; Damson, common, k ; Damson Prune, k, first-rate preserve ; Drap d'Or, d, equal to Green Gage, and earlier ; Early Favourite, d, best early ; Goliath, k ; Green Gage, d k, well-known ; Imperatrice, blue, d k, requires a wall ; Jefferson,* d, better as standard than Green Gage ; Magnum Bonum, red, k ; Mirabelle, k d ; Orleans, k d ; Orleans, Prince of Wales, d k, finer than old Orleans ; Reine Claude Violet, d, bears freely as standard ; Standard of England,* d, new, prolific ; Victoria (Denyer's), d, bears as well as standard ; Washington, d, large, good as standard ; Winesour, k, for preserving ; Woolstan, black gage,* d, new and distinct.

RASPBERRIES.

Antwerp, white ; Antwerp, yellow ; Antwerp, red, unequalled ; Beehive, large ; Double Bearing (River's) ; Fastolf, first-rate ; Prince of Wales* (Cutbush) ; Victoria, in bearing until November.

STRAWBERRIES.

Black Prince (Cuthill's), early, forces well ; British Queen (Myatt's), best for general purposes, large ; Elton Pine, late ; Fertilized Hautbois, late ; Goliath (Kitley's), forces well ; Keen's Seedling, forces well ; Prince Albert ; Princess Alice Maud, large ; Sir Harry,* very fine.

THE CINERARIA.



THE variation of colours and profusion of bloom borne by these generous plants, truss following truss for a long series of time, render it particularly desirable as an ornamental plant. The cultivation is by no means difficult. About the beginning of May, or thereabouts, allowing a few days for the variation of season, I take the offsets and plant them in a prepared compost of leaf-mould, loam, peat, and sand, equal parts of each, providing also a good drainage of crocks, or small brick rubbish. When potted, I place them in a frame with a gentle bottom-heat. Offsets are always to be preferred while they can be had; when not the case, take cuttings, which will root well in sand, and as soon as fit, pot them in the compost spoken of above, and endeavour to get them established as soon as possible; when this is accomplished, I gradually expose them to the atmosphere, till fit to remove into a cold frame, allowing them to enjoy the sun till about nine o'clock in the morning, when they may have a sprinkling overhead, and the lights be drawn on, and be shaded with mats, leaving air at back and front. About four or five o'clock in the after part of the day, give them another syringing overhead, and close the frame for about an hour, when they may be uncovered, and, if favourable weather, the light may be left off all night. When the roots fill the pots, they should be repotted, adding to the compost named above a little well-decomposed cow or horse manure. The plants require daily attention as regards watering, and now and then, while growing freely, may have a little liquid manure of moderate strength, but avoid wetting the foliage. As they advance in growth they will sometimes require stopping back; but when the shoots are of sufficient length, they should be tied out to small neat sticks, so that the middle of the plants may receive light and air. As autumn comes on, watering over the foliage should be discontinued; but carefully attend to keeping the soil at a proper state of moisture, to secure the plant in health. The plant should be continued in a cool frame, and as close up to the glass as can be conveniently done without coming in contact with it. During the day time, indulge them with as much air as you can do with safety; guarding against excess of wet, or sudden storms, likely to do mischief; cover up at night, giving a little air at the back of the lights. As the season advances, and the trusses begin to swell with buds, they should be removed to the greenhouse, allowing as much light and air as the situation will afford. For early flowering, a few may be placed in the stove. The pest, the green-fly, about this time, attacks them wholesale, and must be well guarded against; fumigation with tobacco should be applied the moment they are discovered. Under careful treatment, these plants will continue to furnish innumerable trusses of bloom, from October till the end of April. Summer offsets, or cuttings, that is, if taken in July or August, and treated after the manner recommended, will flower in May and June; thus may the blooming period of this beautiful flower be extended for at least seven or eight months out of the twelve.

BOUQUETS.



OME years ago, when the pretty girls of Gravesend prepared a bouquet for the Princess Royal, they made the very mistake that was fatal to its acceptance by the royal bride—it was too big, and the Princess was obliged to hand it to an attendant to carry for her. Royal personages have purse-bearers, and, in the East, pipe-bearers; and, unless public taste undergoes a change for the better, a bouquet-bearer must be added to the number of satellites that revolve around a throne. Two or three flowers, nicely arranged, are preferable to the grandest bunch of “all sorts” ever culled from a garden; indeed, there is scarcely anything in the region of taste so utterly tasteless as a huge bunch of flowers. Just try the effect of two or three flowers and a few fronds of fern, compared with a posy as big as a drum-head cabbage, and you will see at once that it is a sheer waste of beautiful flowers to make them up into monster nosegays. Let me instance one method of using cut flowers as decorations in-doors. Get a lot of white phials, five or six inches high and an inch and a half in diameter. Fill them three parts full of water, and then go over your roses, and cut as many of the best blooms you have as there are bottles for them. Put them into the phials singly, and the effect will be charming. Take them all out again, and tie them in a bunch, and you will see that indiscriminate bunching is a wasteful and a distasteful way of using cut flowers. For a large ornamental vase, a fine bouquet is, of course, an appropriate thing, if made up with judgment and with due regard to the effect of colours in contrast. An edging of ferns or ribbon-grass adds very much to its beauty and completeness. One of my summer pleasures is to cut one of each of my best flowers every week, to furnish a lot of phials such as I have just described. They are arranged in two rows, one above the other, over the tray-board in the hall, where there are two narrow mahogany shelves to receive them. The phials are tallied with the names of the roses that are to be placed in them, by cutting the name out of a catalogue and putting it on neatly. As the roses will be succeeded by dahlias, labels for these are pasted on the opposite side; so that, for the dahlias, the same phials do when turned round. The labels are varnished, so that they do not wash off when they get splashed with water; and they are, of course, pasted on so as to range in a regular row when the phials stand close together. A little nitre put in the water keeps the flowers good for a week. Another good method of keeping flowers is in glass dishes filled with silver sand. The stems are cut short and stuck in firmly, and the whole kept damp, and with a glass shade over it. In spring, a few dishes of violets are charming parlour ornaments, and, whenever the glass is lifted off, they fill the room with their delicious perfume. A good flower ornament may be made with a pyramid of sand, wetted and pressed firm, and stuck all over with flowers with short stems; but a better way of making a pyramid is to get Stead’s bouquet-stand, which is pierced with holes, and with two

metal surfaces close together, which draw the water up by capillary attraction, and keep them fresh for a great length of time. For this, flat flowers, such as geraniums, pansies, petunias, chrysanthemums, etc., which can be cut singly and arranged in colours, are best. Globular flowers, such as roses, are quite unfit for it.

In contrasting the colours of flowers, it should be remembered that green is a relief to almost any colour, and most especially to scarlet; yellow sets off violet, but has rather a vulgar look when brought into too close a proximity to red. Blue is the best contrast to orange, but blue and yellow are in bad taste; white relieves all colours except pale pink or lavender; and strong colours of any kind destroy the beauty of weaker ones, however charming the latter may be in themselves; hence it is better to tone down glaring colours with white or green than with pale neutral tints. A few examples of bouquets will, perhaps, be useful as a guide to those who wish to excel in the art of using cut flowers to advantage; and, first, for a bouquet fit for a large vase—centre cluster of white asters; next circle of blue violets or blue lobelias; next circle of crimson pelargoniums; next circle of white asters; then circle of red gladioli; next circle of green sprigs of common heath; next circle of purple asters; next circle of white asters; outside dahlias of sorts, or, still better, of one colour, say Lord Bath or Captain Ingram. Another—a sprig of white erica, surrounded with common heath; next ring of red gladioli; next white asters; next blue iris or agapanthus; next crimson verbenas; next white asters; outside blush roses. Bouquets of this sort were exhibited at Versailles, some years ago, by M. Louviot, and were much admired for their beautiful arrangement of colours. Do not forget how much ferns may be employed to give grace of form and lovely hues of green to bouquets, especially maidenhairs, harts-tongues, and polypodies. A white camellia, with two sprigs of mignonette and two fronds of maidenhair, make a chaste posy, worthy the hand of a blushing bride.

JARDINIERS AND BASKETS.



JARDINIERE is the fashionable name for a flower-basket, but it should be applied only to architectural beds and fancy *porte-fleurs*, not to the old-fashioned rustic boxes which look so pretty on lawns. My best Jardiniere is one of Ransome's, made of the patent imperishable silicious stone. It forms a very beautiful object on gravel, as a centre bed surrounded with flower-boxes of the same material. The flower-boxes are filled with soil and planted; but the Jardinets we keep furnished with potting-plants. With rustic baskets it is best to turn the plants out, but Jardinieres that are to occupy prominent places should be furnished with potted plants only, because, if a swarm of caterpillars should appear, or if the plants should get shabby, it is an easy matter to renew them. My Jardinets are kept

bright and showy in all seasons. It stands on a circle of loam, to keep a moist bottom; over this is a layer of sand six inches deep, and on the sand the pots are placed, and hidden with moss or sand. Thus, as soon as the geraniums get poor, they are lifted out, and the bed filled with pompon chrysanthemums in pots. When they are past their best, potted evergreens take their place for the winter. In spring, potted bulbs are used as a succession; hyacinths, in four colours, make a very gay show; the hyacinths are succeeded by autumn-sown annuals in pots, or large patches of *Aubrietia purpurea* and *Alyssum saxatile*, two of the gayest of hardy spring flowers. These last are succeeded by select bedders, and thus the round of the year is completed. I make some good jardinieres of the shallow baskets in which nurserymen send plants; mine mostly measure three feet across, and nine inches deep. In furnishing them, we first put in a layer of moss, then arrange a lot of potted plants on the moss, and with the greenest of the moss, cover the surface, so as to hide the pots entirely. For surplus stock, that would otherwise be standing in pits, or on beds of coal-ashes, these baskets come in well. Potted ferns, variegated plants, geraniums, etc., are all useful if tastefully disposed of. Some of my baskets, filled with hardy ferns in pots, with the hare's-foot and a few other greenhouse potted ferns amongst them, made very beautiful objects. I had a large stock of that wretched geranium, Tom Thumb's Bride, which made a capital pair of baskets on the lawn. On gala days, we cut a lot of ivy, and twine round the rims of the baskets, and this keeps its colour for two or three weeks, and gives them a nice finish. I even use newly struck cuttings, if short of flowering plants; it is better to turn them to account in this way, than to let them grow unseen in the nursery. A circle of young hydrangeas or camellias makes a very pretty edging to a basket of ferns; the variegated mint, *Cerastium tomentosum*, and variegated Alyssum, make capital edgings, and if you have no stock of pot plants, you have only to take cuttings, pot them in sixties, shade them a week, and then furnish your baskets. They root quickly, and produce an effect from the first. The old-fashioned rustic baskets are best planted in the ordinary way, a bottom of large crocks, then a layer of moss, and then filled up with a potting compost, and the plants bedded out in it. For all baskets, vases, etc., that are to be elevated to a level with the eye, use plants of a pendant and graceful habit, but for baskets, that are to be below the eye, geraniums and other bushy plants are the best. Fuchsias never show to such advantage, as when lifted up from the ground level, and seen on a level with the eye. Potted plants plunged in moss should be removed somewhat early in autumn, because they are apt to root into the moss, not only through the bottom of the pot, but over the surface; and as these roots will be destroyed when they are taken out, they cannot have time to recover, before being put into winter quarters. Slugs and snails are apt to harbour under the baskets and among the moss; an occasional hunt will therefore be necessary, and the baskets should be lifted up and the bottoms examined. Jardinieres of this kind, therefore, may either be good traps, or a positive nuisance, at the discretion of the proprietor. In

a garden that is well kept, the best places should be kept gay with baskets all the year round, and the best way of managing it is to have a duplicate set, either of the same, or different patterns. Thus, in September and October the duplicates may be planted with bulbs, and put aside. The summer baskets will keep gay till near the middle of November—mine do. They can then be removed, and their places occupied with those containing the bulbs. But to make these sightly, take the knife and shears, and clip a lot of stems of ivy, variegated shrubs of suitable habit, and dibble these in, and they will keep fresh till the bulbs rise through the surface, and give the eye something to rest upon. Small-leaved, hard-wooded plants are the best, and especially variegated sorts.

Plants for Baskets.—Some seasons ago I tried the *Senecio mikana* sent out by Mr. Thompson, of Ipswich, and found it a most useful foliage plant, to form wreaths and ringlets of fresh ivy-like foliage, but whoever trusts to it for flowers will be disappointed. It is of rapid growth, and most elegant in its foliage. The variegated ivies, especially *Cullisii*, *arborea variegata*, *Vesta*, and a few others, are of great service for similar purposes. The variegated and the large-flowered Periwinkle are also good and well known. Verbenas and abronias train down very prettily, and if used with ivy-leaved geraniums, make very gay baskets. Last summer I planted one of the crimson-flowered ivy-leaved geraniums in the centre of an octagon rustic basket, measuring three feet across, and it soon covered the whole surface, and crept over the edge, and formed a luxuriant fringe of branches, a foot and eighteen inches long. If the planter has a genuine taste and knowledge of his plants, scarcely anything comes amiss in baskets. I generally plant them with whatever bedders are left, after the borders and beds are filled, and if we run short even make it up with cuttings, striking them in their places at once, and as the baskets must be shaded for a week after planting, the cuttings have a good chance to make a start, and if the compost is good, and proper attention given, cuttings of verbenas, petunias, and geraniums soon get strength, and bloom before the middle of July. For stone vases, scarlet geraniums are very effective, as visitors to the Crystal Palace well know. A good edging for the geranium is Mangle's *Rodanthe*; *Perilla nankinensis* is a good colour for the purpose, but rather too erect in habit, but none of the white-leaved foliage plants look well, except in bark or wicker baskets. The yellow moneywort, the variegated ground-ivy, dead nettle, and variegated strawberry are lovely things to creep over and hang down. For a row of stone vases, fuchsias, and agapanthus, one in a vase, and placed alternate, has a charming effect. Indeed, the agapanthus is the best vase plant we have, and blue and white, or slate and stone-colour are the chastest and most delicate of all contrasts, in gardening, to set off scarlet well, so that where grouped with geraniums, in connection with stone work, the blue agapanthus is most valuable. I must confess that I prefer mixtures in bark baskets, in preference to regular arrangements of colours, but if glowing colours are preferred, Tom Thumbs for the centre, and calceolarias next, with purple verbenas round the edge, are charming. To hang down in festoons, lopho-

spermums, and maurandyas are useful, and so is the pretty, but little-cared-for *Linaria cymbalaria*, a common, hardy, ivy-leaved snapdragon, which grows on old walls almost everywhere. Mr. Salter has a variegated variety, which I have not seen, but believe to be very pretty. Most of the tropæolums are good for the same purpose, and especially the old canariensis, if mixed with a few sprigs of dark-leaved ivy; but beware of this old-fashioned canary climber, wherever you use it; it gets naked in the legs, and should be carried across or round a basket before being allowed to drop over, then its eighteen inches of naked stem will not be visible. Fuchsias of drooping habit make good centres. Banks's Glory is a beauty standing alone in a fancy pot or vase, but mixed with geraniums and calceolarias, fuchsias are sure to suffer from the strong masses of colour to which their delicate outlines are exposed. For single specimens, yuccas are charming, especially *Recurva*, *filamentosa*, and *Filamentosa variegata*. The common savin, junipers, and *Picea Canadensis* are pretty conifers that look well in baskets; and the summer baskets may be planted with them when cleared out in autumn to keep their places until those containing bulbs are in flower. People fond of decorating should grow plenty of hardy flowering and evergreen shrubs in pots, to be shifted about and used as required for furnishing. *Azalea amœna*, which has the habit and beauty of a myrtle, is one of the best; *Berberis darwinii* is another beauty, most valuable in winter. Arborvitas, phyllyreas, box, laurels and rhododendrons are others that should be grown in quantity, and when not wanted for decoration, be plunged in a bed of coal-ashes and have all the attention that potted plants require.

INVADERS, VISITORS, AND SETTLERS IN OUR GARDENS.

(Continued from page 280.)



E should be neglecting to notice a large portion of the living creatures which are to be found in our gardens, were we not to tell something about the curious and beautiful beetles, some of which are settlers, and some only visitors to us, but of which many species may be met with even in the course of a single summer's day. It would, however, take the whole of our space were we to describe even the appearance of many of them, so greatly do they vary in shape, form, colour, and size, though in their habits and mode of life there is so great a difference.

Beetles belong to the class of insects to which is given the name of *Colcoptera*, a word which means *wing-sheathed*, owing to their having, besides the wings used for flight, another pair of hard, opaque outer wings or wing-cases, which cover the former from sight, except when the insect is flying. The pair of light gauzy wings are folded up when the beetle is at rest, and the thick sheaths

close together over the body like valves, fitting so exactly that they often seem like one piece, and we are apt to forget the very beautiful and delicate transparent wings which are folded up under their hard shiny coats, ready to be expanded and bear them up into the air.

As we look at a beetle at rest, we can easily perceive that there is not the narrow part between the chest and the stomach which we see in many insects, but that the head and chest are joined immediately on to the rest of the body.

All beetles have but two eyes, but these are what are called compound eyes, and are made up of many small *eye-lets*, which no doubt supply them with very acute sight. As their food is very varied, their mouths are fitted for several ways of getting at it, and in different kinds of beetles are suited for cutting, gnawing, tearing, or chewing; but never for sucking or for lapping, like those of the fly and bee. And they need all these different little instruments for feeding themselves, since some prey on the flesh of dead animals, some on rotten wood, some on wood that is fresh and growing, some on the roots of grasses and plants, some on grain, and some on leaves; while the most dainty of all would seem to be those who feed on the petals of flowers. Beetles pass through the same changes and transformations as other insects. At first the form is like that of a grub or larva, like a short thick worm, its body very soft, but with a horny head, something like what it afterwards has as a perfect beetle. In this state it prepares for the change into a pupa or chrysalis, by contriving some kind of defence around it. Some have been hatched from eggs previously laid in the earth, and when about to undergo the change, they hollow out the earth around them so as to form a little cave. Others make a sort of cocoon, by joining together particles of earth with web or sticky matter. Those which live in wood have no need of cocoon, but change into pupæ in the hollow they have made while feeding on the fibre of the wood; while some, which feed on plants, hang themselves in round silken cocoons from the leaves or stalks of it.

We have no English beetles which are to be compared in splendour with the Diamond beetle, which is found in tropical countries, whose wing-cases, when seen in the microscope, seem studded with brilliant gems; yet many of our garden beetles are very beautiful in form and colour in their delicate antennæ and legs, and in the hues of their wing-cases. We find in the centre of our roses the beautiful rose-beetle, with its body of a bright emerald green burnished with gold, and who seems as if conscious of the becoming contrast of the glowing pink or crimson of its cradle to the hue of its own body. The first state of life of the insect is very different to the nature of its favourite food, since the grub is found in decayed wood and ant-hills. Perhaps no beetle is more unlike the rose-beetle than the great brown cockchafer, which we sometimes encounter in our gardens in the evening, when it will strike against us as it flies, as if its sight were imperfect; from which circumstance is supposed to come the saying, "As blind as a beetle." When the female cockchafer wants to lay her eggs, she digs a hole in the ground

about six inches deep, and there leaves them, and by and by comes from them a white or greyish-coloured grub, which feeds on the roots of plants for years. It then goes still deeper into the earth, and changes into a pupa or chrysalis, and at last makes its way out of its subterranean abode a perfect cockchafer.

Another species of beetle, with which we are all so well acquainted, is the little lady-bird, or cow-bird, as it is called in some counties of England. There are several kinds which frequent our gardens. One with two black spots on its round and scarlet wing-cases; another with five spots; while some are black spotted or blotched with red. It is a useful insect in gardens, because it feeds on the aphides, or plant-lice, which destroy so many vegetables. The largest of all our English beetles is the stag-beetle, which very rarely pays us a visit, but who has such stag-like horns standing out



FEMALE BURYING BEETLE.

from the front of its head, that we are sure to know its name. The burying-beetle is, perhaps, the most curious of its race in its habits. It not only lives on the flesh of dead animals, but after it has feasted on them, the female lays her eggs in the same body, in order that the grubs which come from them may have the flesh of the creature also for their food. To secure this the beetles bury the dead

body of the bird or mole which they have found, before they begin their feast. First they dig around it a sort of trench, and then gradually hollowing out the earth beneath it, pull the body down. While the little sextons are invisible, the body may be seen gradually sinking down into its grave.

Very nearly related to beetles is the earwig, which has also its two sets of wings, with the gauzy pair folded up like fans under the sheath-wings. The grub and chrysalis of the earwig is very like the perfect insect, only without wings and wing-cases. It has very strong horny mandibles or jaws, and we know well the curious pair of pincers it carries about at the end of his body, as if for defence. If we want to find a number of earwigs, we must look for them in some moist place, such as under a large stone or some decayed straw, and yet, while it will live on animal food, it will eat the leaves and petals of flowers.

Any injury, however, which earwigs do in a garden is made amends for by their eating in their turn many mischievous insects. It has been a very mistaken notion that earwigs were apt to get into people's ears, and the notion has perhaps originated from the name of the creature, and not the name from the practice of so doing. The word earwig comes, in fact, from *ear*, and the Saxon word *weiga*, a worm. In German it is called *Ohrwurm*; and both names have probably come from the shape of its beautiful gauzy

wings, which are just the form of the human ear. Perhaps, too, the notion has also been preserved, from the habit which these little creatures have of creeping into holes during the day-time to hide from the light; at all events, they seem to be always suspected of doing harm which never happens, and do not deserve to have gained such a bad reputation, since they show great affection for their offspring, and take the most tender care of them, the female earwig sitting on her eggs to hatch them, and then gathering the grubs under her body to protect them, just as a hen does her chickens.

(To be continued.)

ON THE CULTURE OF THE HYACINTH.



THE hyacinth belongs to the sixth class of Linnaeus, and natural order *Asphodelea*. Some of the species which formerly belonged to it are now assigned to other genera; and though eight or nine still belong to it, almost the whole interest of the genus is concentrated in the oriental species—*H. orientalis*. This has long been one of the most esteemed of florists' flowers; and it now comprises a vast multitude of very beautiful varieties. It is originally from the Levant, but has been brought to its present improved state in the Low Countries. Double hyacinths are now the most highly prized, though formerly these were as little sought after as double tulips are now; the beauty of the flower being then regarded as consisting in the regularity of the shape and disposition of the blossoms, and the richness of the colour. It derives its name from the annals of mythology. Hyacinthus is said to have been the son of Amyclas and Diomedé; he was greatly beloved by Apollo and Zephyrus, to the former of whom his education was entrusted. Zephyrus, jealous of the affection evinced by Hyacinthus for Apollo, and incensed at the coldness and indifference manifested towards himself, determined upon revenge. As Apollo once played at quoits with his pupil, Zephyrus blew the quoit upon the head of Hyacinthus, who was killed with the blow. Apollo was so disconsolate at the death of his favourite, that he changed his blood into the beautiful flower which bears his name, and placed his body among the constellations.

SELECTIONS OF BULBS.—As an important element of success, an early selection of bulbs is recommended. This, in most cases, will ensure to the purchaser larger quantities from which to choose, and finer bulbs may be obtained. They will also be found in much better condition than later in the season; for they are not unfrequently bruised by the incautious handling of persons whom the seedsmen, perhaps, finds it difficult to restrain. Should any delay occur in procuring them, they will have started into growth; for the hyacinth "knoweth its times and seasons," and when nature bids its starry clusters appear it immediately puts forth its roots, seeking for nourishment, and uses every effort to mature its parts. If the food it seeks be withheld, it will draw from sources within itself the

nourishment with which nature has supplied it; but, like many other unassisted efforts it fails to mature its parts, and perfection is not attained. Let, therefore, the bulbs be chosen *before they begin to grow*. Some will select those which have started, feeling assured of their being alive from the growth already made; but, if a good, sound, heavy bulb, of average size and free from bruises, be obtained, the result need not be feared. First-rate varieties are now so numerous, that it would be almost hopeless to attempt to frame a select list. As a proof of this, it may be mentioned that more than 2,000 sorts are in cultivation at the present day. Let an intelligent seedsman guide your choice, due regard being had to those which have proved themselves favourites in seasons past.

BEGINNING TO GROW THE BULBS.—The *best* time for starting them into growth is the middle of October, but a much later period will ensure fine blooms.

WHAT SORT OF BOTTLES TO CHOOSE.—The following remarks appear in McIntosh's "Flower Garden": "As roots shun the light with as much instinctive care as stems and leaves court it, the sort of bottles best suited for growing hyacinths in water are those of the darkest colours, such as blue and green. Black or opaque would be preferable."

MANAGEMENT OF BULBS.—Having filled the bottles with *clean rain water*, introduce the bulbs; but do not let them touch the water by half an inch. Place them in a dark closet or cellar, in order that the roots may grow *first*, for reasons before alluded to. The flower starts from the heart of the bulb so soon as it can escape from the leaves which enclose it, when it requires and must have nourishment. If it has but few and short roots, the flower will be poor and dwarfy in consequence. When the roots are of sufficient length—say four or five inches—remove the bottles to a situation where the bulbs will have light, but not too bright at first, and in a week or so place them near the glass in a greenhouse, or in a sitting-room window.

In each case be careful to avoid too great a change of temperature, which should be but little higher than that of the place from whence you remove the bottle. Let the plants have *air* on all convenient occasions, or they will grow tall, pale, and weakly.

A variety of methods for giving vigour to the plants, and brightening the colours of the flowers, have been resorted to—such, for example, as adding to the water a few lumps of charcoal, a little nitrate of soda, or a small portion of saltpetre; but the following has been found to answer well: dissolve half an ounce of guano with so much chloride of lime as would equal the size of a large pea, in a *quart of rain water*. Let this mixture stand for a day or two to become clear. Pour about two teaspoonfuls into the bottle twice a week, after the flower appears well out of the bulb.

CHANGING THE WATER.—It has been ascertained that the hyacinth discharges an excrementitious matter from its roots. Such being the case, the water becomes poisonous, and requires changing every two or three weeks. Let the fresh supply be of the same temperature as that in which the bulb has been growing, for remember

the heat of the room or greenhouse has taken off the "chill." The flowers will receive a check if you do not attend to this. Such plants as appear to grow too rapidly should be removed to a little cooler situation—say from the sitting-room to the parlour, or any such place, according to convenience. On the other hand, such as appear too stunted should be removed for a short time to a little warmer situation—on a chimney-piece, for instance, in the sitting-room; but not for too long a period, or they will be weak and pale, as before stated. Observation is the best guide in all these matters.

APPLICATION OF THE SUPPORT.—The support may be fixed in the bottle previous to placing the bulb in it, or when the flower has grown six or seven inches high. Place the lower, or springing circle, round the stem and leaves; then raise the bulb a little from the bottle and pass the wire over it; fix the spring in its place by compressing it with your forefinger and thumb; then place your right hand round the back of the upright rod; with your finger and thumb spring open the sliding wire sufficiently to admit the flower stem, at the same time holding the whole of the leaves in the left hand; raise the sliding wire as high as the flower will admit, and place one by one the leaves within it, first having decided where the rod should be placed, that the leaves may be arranged uniformly. Open the small wire and place it immediately under the flower; then close it again; raise or lower the wire encircling the leaves according to taste.

When the plants receive the light from *one side only*, turn them round often, or the flowers will incline towards it.

Keep the bottles filled with water, observing the temperature, as before directed.

If the hyacinths are grown in pots, on the open ground, select the finest flowers, and remove them in bottles. In doing this turn them out of the pots, and place them in a tub of water, not too cold, for a few minutes; the soil may then be easily removed, without injury to the flowers. Wash the roots clean, and place them, as before directed, in the bottles. The improved appearance will well repay the trouble.

TREATMENT AFTER FLOWERING.—Many bulbs are rendered utterly worthless by careless treatment after they have done blooming; whereas, fine blooms, if not equal to the first season, may be relied upon, if treated in the following manner:—

The moment the flowers *begin* to decay, remove them from the glasses, and plant them in *good rich compost*, consisting of three parts of good decayed turf, and one each of well rotted cow-dung and sand.* Let the flowers and leaves die off before taking up the bulbs; and do not on any account *cut* them off when green, as this greatly impoverishes the bulb.

* This is the plan pursued by the Dutch growers, who in making their compost, prefer the softer leaves of elm, lime and birch, and reject those of oak, chestnut, walnut, beech, plane, &c., which do not decay so quickly.

THE ART OF BREWING.



THE preparation of beer is one of the most important processes of domestic economy, and, if conducted upon scientific principles, is productive of a beverage which, moderately used, is, perhaps, as salubrious to the generality of persons, as anything can be that possesses intoxicating qualities. We shall not hamper our subject with technicalities or difficulties, but simply define *brewing* as the art of extracting a saccharine and mucilaginous fluid from the malt of *barley*, and of combining it with the bitter principle of the *hop* only; and by fermentation, reducing these combined principles to a fluid, holding the flavouring extractive matters of the two substances employed, in union with a greater or less proportion of an alcoholic spirit, according to the bulk and quality of the malt employed.

Beers are said to be prepared from various other saccharine substances, and to be rendered properly bitter by other matters than the hop. We reject all such assertions as vague, and tending to produce disgust and disappointment. It is readily admitted that fluids, possessing vinous or alcoholic properties, may be prepared from the matters alluded to; but having tested the products of some of them, and heard the opinions of other persons on the subject, we are induced, after the experience of above thirty years, wherein we have practised and overlooked the art of brewing, to say that good English beer and ale can be procured from the best malt and hops only, and from no other substances whatsoever.

Brewing, to be successfully practised, must be more or less understood in its principles; that is the *science* of the art, and it is described in a very excellent work upon general subjects which we have seen, as comprehending "a knowledge of the properties of the substances employed, and the principles of fermentation, together with a constant attention to the temperature and specific gravity of the wort," so as to secure "an uniformly successful production of good beer, combining, as it ought to do, the requisites of clearness, soundness, and of that full measure of strength and flavour which can be derived from the materials employed. Without this knowledge as a guide, the success of the process will be, at the best, but uncertain, because changes in the temperature of the air, variations of the weather, or atmospheric pressure, may render modifications necessary, of which no judgment can be formed by positive rule."

The admission contained in the last line of the quotation comprises the pith and marrow of the whole; for, while it is added that the knowledge of the principles required is most desirable, it is placed beyond all doubt, by experience, that brewing and its results are mysterious processes, more or less removed from the art and power of man.

Those mighty electrical mutations which govern the direction and operations of wind, and induce the formation and dispersion of atmospheric vapours and masses of clouds, constitute the *primum mobile* of the *process of fermentation*—a process upon which the quality and maturity of the liquor produced wholly depends. A

brewer can ascertain the quality of his malt and hops, apportion the quantities, add or diminish heat, and supply the barm or ferment; but there he must stop, for unless the natural agents come to his assistance, he is more or less embarrassed.

Brewing, particularly that of private families, where but small batches (*gyles*, as they are termed), are required—must be subject to mutations, and he is fortunate who, out of three barrels brewed at one time, and in the same vessels, shall have two turn out of a precisely similar quality.

We mention these circumstances, that *any one* who commences brewing may not feel disheartened if he be not uniformly successful. And while upon the subject of atmospheric influence (and to avoid recurring to it), we shall say that October and February are the two best seasons of the year. The former premises a duly abated heat—that is, a temperature of about fifty or fifty-five degrees, as the medium, and it secures the mellowing influence of the whole winter, wherein the slow, progressive fermentation in the barrel is perfected without serious interruption. *February* is a moist month, generally; and, whenever rain approaches or falls, with the wind at the south-west, and rather lively, (the frequent concomitant of the month), fermentation is always most energetic.

Hence, though the winter be passed, February is propitious, and speedily effects those processes which perfect the beer. The cold, dry, north-easterly winds of March supervene, and protract the final mellowing of the beer, whereas, if the brewing be deferred till March, the weather, in ordinary cases, is inimical to the first great fermentation; and the secondary fermentation in the barrel is carried on too rapidly by the atmospheric influences of April, and the sudden accessions of heat. The result is, a hard and acescent fluid, very remote in its qualities from the mild, bland ale of October. The people of Staffordshire, and the adjoining north-west countries where some of the best beers in the kingdom are brewed, used to observe that *March brewings* were always *beerish*, by which term they meant to express the hard flavour which ale of a great age acquires, after having lost its sweetness.

Having thus far noticed the first principles of the art, we must regret that our limits do not permit us to describe minutely the apparatus to be used. We therefore recommend that the reader who is anxious to trace every step of the process, should peruse the *Treatise on Brewing*, of the Society for the Diffusion of Useful Knowledge. Sixpence must be well laid out if but a valuable hint concerning the construction of the copper, furnace, mash-tubs, coolers, casks, funnels, sieves, etc., be obtained.

All these must be possessed by every one who means to brew even ten gallons of beer, and they would take ten pages to do them ample justice. However, there is one species of vessel which we deem it a duty to dwell upon, and this we shall allude to, after we have said a few words upon malt and malting, and hops.

To avoid prolixity, we presume, however, that our readers are possessed of a copper capable of boiling fourteen gallons; of three cooling vessels, at the least, each of which will contain seven

gallons when the liquor in them shall not exceed five inches in depth; of another tub or cask large enough to receive the cooled worts (ale and beer); and casks of six gallons each. We do not mention a larger size, because, if the brewing be small, they imply a limited consumption, and nothing injures beer so much as long exposure to frequent admissions of air. Four or five six-gallons of mild ale, and six gallons of table-beer are intended to be brewed, and these quantities we will select as the basis of our directions.

Malt, to be good, ought to be crisp, tender, and full of flavour throughout; if, with these properties, the grain be plump, and sweet to the taste, from point to point, it is excellent.

Hops are a staple product of Kent, Surrey, and Worcestershire. For porter-brewing, the intense bitter of the *Kent* is, it appears, peculiarly suitable. Surrey, or Farnham hops, are of a clear, bright, greenish yellow, and full of fragrance—they are excellent; but the Worcester hops are the best for the domestic brewer—mild, and full of exquisite flavour, they suit the delicate quality of table ale; and the specimens of *that* brewed in Worcestershire, Shropshire, and Staffordshire, prove the assertion to be correct. Hops ought to abound in "*condition*"—that is, in a yellow powder about the seeds, which yields a sticky feeling or clamminess to the hands when the hops are rubbed smartly. The malt being chosen, the brewer should decide upon the quality of the ale he intends to make, also that of the table-beer. It should always be remembered that beer, however weak, is superior in quality if it contains all the properties of the malt, and be, therefore, brewed expressly. It is, however, a point of economy to prepare a small quantity of beer from the grains after the ale-wort has run off; but the weak wort so obtained cannot be supposed to be so good as if the same quantity were made from a given measure of malt, none of the strength and fine flavour of which had been extracted by a previous washing for ale. Another consideration of moment is this—that if *one* bushel of malt yield, to a certain quantity of water, a wort of any required strength, *five or six bushels* will yield to a corresponding quantity of water a wort of greater comparative strength; because, the greater the bulk of the materials employed, the more certain and profitable will be the results, in consequence of the equability and steadiness of the heat employed.

The saccharine matter and mucilage of malt are yielded only to water at a certain temperature. A thermometer, therefore, must be employed. The heat mentioned by most writers is comprised between 170° and 180° of the instrument. Now, we are willing to admit that if malt be imperfectly prepared, and, therefore, partake of the quality of barley to a certain extent, a heat exceeding 180° will render the mass pasty (or "set" the malt); it will also do the same if the malt be highly dried and brown, as that for porter; but if the process of malting have been perfected, and the article chosen be either that termed pale, or "amber" malt (which two sorts are alone proper for ale brewing), boiling water may be used for the mashing. Of this we have had ample and most satisfactory proof. The best ale we ever saw or tasted—and that not once or

twice, but during a period of eight or nine years—was brewed in Staffordshire, by a near relative, the celebrated Mr. Wedgwood, of Etruria. The malt was purchased at Newcastle-under-Line, the hops were those of Worcestershire; three quarters of a pound of the latter were always allowed to every bushel of the former; and the brewing we witnessed—MS. notes of which are now before us—was upon the scale of six bushels of malt to four pounds and a half of hops, to yield forty-four gallons of ale, and perhaps twelve gallons of beer.

(To be continued.)

THE GARDEN GUIDE FOR OCTOBER.

THE FLOWER GARDEN.



SEE that chrysanthemums are securely staked; train out the plants in pots, and make them neat and tidy for blooming, and give plenty of water and liquid manure. Where required to take the place of bedding plants, get them into their places without delay, and lift carefully with good balls. Plant hyacinths, tulips, crocuses, scillas, crown imperials, lilliums, gladioli, narcissi, jonquils, daffodils, and snow-drops. Part and plant out perennials in the borders, get auriculas and carnations under glass for the winter, but give plenty of air. This is a good time to plant American shrubs of all kinds. Remove decaying leaves; keep walks and lawns tidy.

KITCHEN GARDEN.

Make a general clearance of the ground wherever there are vacant spaces, and ridge up all plots not to be planted on during winter. Get a waste corner clear for heaping up manures and composts, where they can be turned over during frosts, and, if convenient, empty the muck-pit, and cover the rotted stuff with a layer of soil to throw off rain; the whole to be turned two or three times before using it in spring. Plant out the August sown cabbage; leave the weakest in the seed-bed for future planting. Plant out lettuce in a warm situation; take up potatoes, carrots, beets, and parsnips; earth up celery. Use the fork, spade, and hoe as much as possible to keep all plots clean, and destroy the large crops of weeds that the autumn rains will bring up. Lay cabbages and broccolis that are forward with their heads to the north; fork over asparagus beds, and mulch the crowns with rotten dung. Get cauliflower plants under hand-glasses, and pot a few to keep in frames.

FRUIT GARDEN.

New plantation of gooseberries, currants, and raspberry bushes, may be made towards the end of the month. Get the ground ready for fruit-trees that are to be planted next month, let it be well drained and deeply trenched, but, unless the soil is poor and exhausted, use no manure whatever; pure loam is preferable to an enriched soil, for all trees intended to bear early and live long.

GREENHOUSE AND STOVE.

Fire-heat must be cautiously used in the greenhouse, so as not to push things too fast. Remove the shading, give plenty of air, and whenever green-fly or thrips appear, resort to effectual methods at once, and much future annoyance will be saved. Plants that are to bloom during the winter should have the best place as to warmth; and if fires become necessary, let them be got up brisk, so as to dry the house, and allow at the same time of a current of air. Reduce the heat among pines, so as to keep them growing slowly. Be careful not to push pines into too rapid a growth. Keep the air very dry where grapes are hanging. Bottom-heat for pines, 85°.

TO CORRESPONDENTS.

BEDDING PLANTS IN WINTER.—*E. D., Hackney.*—You need not quite despair if you have no better place than a shed to winter geraniums, fuchsias, etc. Severe weather will kill such things, but while the frosts last the plants may be buried in darkness for a fortnight at a time by means of mats, or even a temporary thatch of straw or turf, to be removed at the first break of the weather. The drenching rains of October and November ruin tender plants exposed to it more than a slight frost, and indeed render them unable to bear a little freezing. If got under cover before the heavy rains set in, protection from severe and long-continued frosts is all that is necessary. Try and arrange so that some light enters the shed, and should you not be able to afford one of the new portable greenhouse paraffin lamps, see that the shed shuts up close, and try a large stone bottle holding from four to six gallons, painted outside with lamp black and size, and fill it every night and morning with boiling water during frosty weather. Should we not have a very severe winter, we think it might suffice, especially if assisted with a few mats on the outside of the shed.

AMARYLLIS.—*Rose, Croydon.*—The amaryllis requires good greenhouse treatment; and we suspect that why you have failed in obtaining bloom is that you have not fed them well enough while growing. A good mixture for the amaryllis may be made of turfy loam, old manure, and a liberal mixture of sand. Give them good greenhouse temperature; and after they have made their growth keep them dry and warm for eight or ten weeks, and do not repot them until they begin to grow again.

SHRUBS UNDER TREES.—*Ignoramus.*—The common tree-box, *Aucuba japonica*, common ever-green *Euonymus*, common privet, phillyrea, ivy, and periwinkle, are some of the best for such a situation. The following also might succeed—*Taxus canadensis*, *Taxus adpressa*; common holly, variegated holly, American *Arbutus*, *Ligustrum japonicum*, *Ligustrum lucidum sempervirens*, *Skimmia japonica*, hybrid rhododendrons, *Berberis japonicum*, *B. fascicularis hybrida*, *B. aquifolium*, and variegated box. The rhododendrons would require some peat.

AGAPANTHUS UMBELLATUS.—*H. S., Hove.*—This should now be shaken out and repotted in mellow, sandy loam, and be set aside in a warm corner out-of-doors, and be moderately watered until there is reasonable fear of frost, and then it should be transferred to the cold pit for the winter. After the middle of April it may be set out-of-doors in a sheltered place, and during May, June, and July should be treated as a half aquatic, and stand always in a pan of water. Many amateurs spoil this plant by giving insufficient water. The more open air it has, without being touched by frost, the better.

SCALE.—*W. C. K.*—When scale gains the ascendancy in the stove, it is almost impossible to eradicate it. With hard-wooded plants the first thing to be done is to brush the stems and branches with a hard brush. Another step in the process will be to brush the stems of all plants likely to bear the application with spirits of turpentine, which must be brushed into all the crevices of the bark where the scale insect usually broods over its eggs. Plants of delicate structure, such as ferns, which cannot be brushed, must be shut up close in a box, with a vessel of boiling water, over which is placed a saucer full of turpentine. The heat will cause the vapour of the turpentine to rise amongst the plants, and the scale will be destroyed. These remedies are to be repeated; however effectual or otherwise they may prove at first, as one operation should never be trusted in for the eradication of vermin. There is another plan, and that is the use of sweet oil, which is very effective, but it makes the plants look very miserable for a time, and every leaf it touches will perish. But it does no harm to the bark of trees and shrubs, and we once saw a very fine collection of succulents treated with oil throughout, which cleansed them of scale completely, and the plants the next season made a very vigorous growth, though immediately after the application of the oil they had a very sorry appearance. It may be as well to add, that insects breathe through apertures in various parts of the body, and oil closes these, and causes their death by suffocation. No insect will survive being thoroughly covered with oil.



ORCHIS FOLIOSA.

ORCHIS FOLIOSA.



HE flowers of most of the orchids are remarkable for their grotesque forms, some resembling the heads and bodies of animals, as the Bee Orchis, the Fly Orchis, etc. The species *Orchis foliosa* is a native of woods and copses in Madeira, and was introduced into this country in 1829. It is a species peculiar to the island of Madeira, where it is found in the rocky banks of Ribeiro Frio, amongst grass and bushes of *Spartium candidans*, at an elevation upon the hills of three thousand feet, and where it sometimes grows to a considerable size, the Rev. R. T. Lowe (formerly for twenty years British chaplain in Madeira) having gathered one native specimen which measured two feet seven inches in height. The plant is very much like one of our native species (*O. latifolia*) from which, however, it differs in being larger in all its parts, in having a distinctly three-lobed flat lip, instead of a lozenge-shaped convex one, a shorter and more slender spur, and a taller stem. In this country the plant produces its fine spikes of purple flowers, sometimes three inches broad, in May; and it succeeds extremely well, either in well-drained pots or a turf pit, in a soil composed of the turfy portions of heath mould with a mixture of moss and sand, or in one of rich moist peat, loam, and sand. Orchids are generally propagated by their bulbs or tubers, as few of the species produce seed with any certainty. The bulbs or tubers of most of the species are of a peculiar structure and economy. An orchis, on being taken out of the ground, is found with two solid masses, ovate or fasciculated (arranged in bundles or parcels) at the base of the stem, above which proceed the thick fleshy fibres which nourish the plant. One of these bulbs or tubers is destined to be the successor of the other, and is plump and vigorous, whilst the other, or decaying one, is always wrinkled and withered. From the withered one has proceeded the existing stem, and the plump one is an offset from the centre of which the stem of the succeeding year is destined to proceed. By this means the actual situation of the plant is changed about half-an-inch every year; and, as the offset is always produced from the side opposite to the withered bulb or tuber, the plant travels always in one direction at that rate, and in a dozen years will have marched six inches from where it formerly stood.

CHOROZEMA.



HIS is one of the most beautiful and interesting of the New Holland genera, and the great part of the species are well worth cultivating. The following short account of the method of growing and flowering them is from actual practice. First, as to propagation. This is generally done by cuttings in spring, say the middle of April, and

when young shoots have made wood. About an inch long, the shoots intended for cuttings should be taken off with a sharp knife, and with a small portion of the old wood attached, or what is generally termed a heel; I take off as few leaves as possible.

The cuttings are inserted in pots half filled with potsherds; over these I place a little moss, to prevent the soil getting into the drainage. I then fill the pots to within an inch and a half of the rim with a mixture of peat and sand, taking care to use Reigate sand, then fill it up with pure sand, and water with a fine-rose pot. The cuttings are inserted about half-an-inch apart, leaving room for a bell-glass to cover them. I water them slightly with a fine rose, to settle the sand about them, and then plunge in a slight bottom-heat; the glasses are wiped every morning at least, or twice a day if they are damp, watering when it is required with a very fine-rose pot, taking care to keep the sun off them, for if this is not attended to the former labour is in vain. They will strike in a very short time, and when well rooted into the peat they are potted off into thumb pots, and shifted as often as they require it. The soil I prefer for potting them in is two parts good turfy peat, one part decomposed cow-dung, and one of sand and charcoal (clean river sand I prefer, if I can get it); these are well mixed together, but not sifted, as I have a dislike to sifted soil for all pot plants—I use it as rough as possible, for if the soil is open and porous the plants will thrive better, growing strong and healthy; if, on the other hand, it is close, they will never be seen in a healthy condition.

The flowering season of the *Chorozema* is from March to the end of May. I prefer shifting them as soon as they are out of flower. I give them large shifts, and plenty of drainage, using oyster shells and charcoal for the purpose, and putting a little moss over the charcoal.

When the potting is finished, I give the plants a good watering, to soak the soil well through. I give the large-leaved specimens plenty of weak manure water through the summer months. Great care is requisite in the autumn and winter as regards watering, as the plants are then in a state of repose, and if it is not judiciously done the roots will rot, and the plants become sickly and die. The plants should never be exposed in the open air, but kept in a house or pit in the summer, shaded when the sun is powerful, as that is injurious to the young shoots and foliage. The species belonging to this genus are not very numerous, but all very beautiful, and well worthy the greatest care that can be given to them. I will enumerate a few which I know and can recommend;—*Chorozema Lawrenceiana*, a beautiful species when well grown, but seldom in good condition, a hybrid of Mrs. Lawrence's, of Ealing Park; *C. varium*, a very pretty species, the plant is a very robust grower, native of New Holland, introduced in 1836; *C. var. ilicifolium*, this is also a pretty species, nearly allied to the old cordate, the colour of the flower is scarlet but small, native of New Holland, introduced in 1803; *C. Dicksonii*, this is a stiff-growing little species, forming a beautiful plant and very distinct, colour scarlet and yellow, introduced 1836; *C. ovata*, a lovely species when well grown, it makes a fine show

plant, being bushy, with large scarlet flowers, native of New Holland, introduced in 1830; *C. Henchmanii*, one of the most beautiful of the whole genus, when in bloom it is a mass of scarlet flowers if well grown, but it is one of the most difficult plants in cultivation, a native of New Holland, introduced in 1825; *C. spartioides*, this is a splendid climbing species, the flowers are large and yellow, it is a scarce plant, and very difficult to cultivate, but it is well worth a trial, a native of New Holland, introduced in 1836; *C. flava*, this is a lovely species, but difficult to cultivate as a handsome specimen, but is well worth the greatest care, the flowers are yellow, as a free bloomer; *C. angustifolia*, a slender grower, but very distinct, and deserves a place in every collection. These are the species I am best acquainted with, and I can recommend them to the attention of the cultivator.

ERICA ELEGANTISSIMA.



A DWARF shrub of close habit; the stems well covered with squarrosely spreading, rather pale green, linear, obtuse leaves. It produces its flowers in clusters of four up the lateral shoots, and the flowers are large and showy. The inflated base of the tube is contracted gradually upwards, and is of a deep purplish crimson; the white, triangular teeth spread horizontally from the throat. The leaves and sepals are ciliated with rather distant glandular hairs. It is said to be a hybrid between *Erica hiemalis* and *E. Hartnelli* (*erivita*, Loddige's Bot. Cab. 4432), the latter of which is supposed to be a hybrid belonging to the Ampullaceous group of the section *Euryloma* (*Don*). As a winter bloomer, it is a valuable variety, and it blooms freely. The generic name *Erica*, altered by Pliny from the *ereike* of Theophrastus, is derived from the Greek *ereiko*, to break in pieces, on account (as some say) of the brittleness of their branches, or (according to others) from the supposed virtues of some of the species in breaking the stone in the bladder.

This very pretty addition to our stock of winter-blooming heaths must be placed among the hard-wooded section, and is, like some of its companions, of rather slow growth. Having originated in part from *E. hiemalis*, a remarkably free-growing plant, in some measure it takes after that species, and grows freely; but it is a very distinct and desirable variety.

Heaths delight in turfy peat soil, liberally intermixed with white sand potsherds, or pieces of charcoal, broken small. If the plants are healthy and well rooted, give them a liberal shift, that is, from a three-inch to a six-inch pot, taking especial care to drain the pot properly; but if the plants are badly rooted, a smaller shift will suffice, until you get them into free growth. Water carefully, with soft water, especially after the plants are fresh potted; but, at the same time, recollect that more heaths are destroyed by the want of water than by receiving too much. Heaths are propagated by cuttings, formed of the tender tips of the young shoots, about an inch

in length; these are carefully prepared to avoid bruising any part of the stem, and are inserted in cutting pots prepared with a surface of firmly pressed, pure, and moistened white sand; after watering, to settle the sand close about them, and allowing the moisture to subside, they are covered with bell-glasses, the edges of which are pressed a little into the surface of the sand, so as to completely exclude the air. They are then placed in a propagating house, or in a spent hot-bed. The glasses should be wiped inside, if much dampness accumulates. When they begin to root, which will appear from the starting of the shoots, they must have a little air daily, to harden them, previously to removing the bell-glasses entirely.

THE CULTURE OF LILIUM LANCIFOLIUM.



THE present is a suitable time to commence preparations for growing the varieties of *Lilium lancifolium* as ornamental pot plants, either for exhibition or for decorating the conservatory. This class of Liliums is decidedly the best for pot culture, not only on account of their beauty and fragrance, but also from their habit of flowering late in the summer. They are, moreover, easily managed, and are, therefore, very suitable plants for amateur cultivators. Good, strong, healthy bulbs, which have now become cheap, should be purchased at once, and may be potted into the following compost:—Three parts peat, each chopped very closely, and one part of good loam; a good quantity of sand should be intermixed—the clean, gritty sand which builders use will do, but white sand is better. To produce a good display, two or three bulbs may be planted together in a pot; six or eight stems form a good plant, and may be produced by planting two or three of the double crown bulbs which are often to be selected from among strong roots, and are more suitable for pot culture than a number of single-eyed bulbs. No. 6 pots (thirteen inches diameter) will do very well for two or three such bulbs, which will furnish five, six, or more stems. The plants do best on the one-shift system; the bulbs should, consequently, be planted at once in the pots they are to flower in, taking care that they are well drained. On the two or three inches of broken potsherds, place some of the roughest of the soil, to keep the finer from mixing with and choking the drainage; fill up the pots to within three inches of the top, and then place the bulb or bulbs on the surface of the soil, covering about one inch of soil over them. Do not water them after potting, but place them in a cold frame or pit; or beneath the greenhouse stage, if care is taken that they do not get wet from the drippings of the plants above them. When they commence growing, if under the greenhouse stage, remove them into a frame or pit; and wherever they are placed, let them, under favourable circumstances, have plenty of air, so as to keep them stocky. Give them a good watering in this stage of their growth,

and then let them remain without water for some considerable time; they do not yet require frequent waterings.

Keep a watchful eye on them as they advance, that they do not get infested with the green-fly, to which they are liable; and if any of these troublesome insects appear, take the plants out of the frame or pit, and give them, singly, a good syringing with tobacco-water, holding the syringe over the central bud, that the tobacco-water may penetrate among the bases of the young leaves, where they are apt to suffer most from the attacks of the aphides. About two hours afterwards they must be syringed again with clean water, to wash the stain of the tobacco-water off them.

By the latter end of March, or early in April, if the season is a favourable one, they will begin to grow vigorously; they will then require a greater quantity of water, and may be watered overhead, or syringed every genial or mild morning. They must now also have an abundant supply of fresh air. If they are in a frame, it will be a good plan to raise it from the ground by putting a brick under each corner, by which they will get plenty of bottom air; but the frame must be let down again if the weather should turn out frosty, or a cutting north-east wind should prevail, as is sometimes the case. About the latter end of May they will require turfing up; that is, a square box of fibrous peat should be built up above the pot rim, and pegged together so as to inclose the base of the stems. This must be filled up with the same kind of compost as that in which they were potted, only made finer and more sandy; they will root into this soil, which will assist them very much. The plants must be tied up to the form required, and put into the greenhouse, if the frame is not deep enough to hold them; they should be raised up near to the glass, that they may not draw, which they are very apt to do when growing freely. Continue the syringing every morning when circumstances are favourable, as they are particularly fond of a shower bath.

After they become pot-bound, which will be the case some time in June, water regularly with soot-water, which gives them a very healthy dark green colour. This soot-water is made by putting three pecks of soot to eighteen gallons of water, which will be quite strong enough; stir it well up together, and after it has settled skim off the top, and it is then fit for use. Continue watering with this soot-water until they show signs of flowering. When the flower-buds appear, they may either be kept back or hastened; the latter by placing them into the stove, for they do not draw up after they have reached this stage of their development, and will bear a very high temperature if freely watered and syringed. Where there is, say, a dozen plants, it is advisable to push on some of them in the stove, and to keep the others in a cool, shady place, so as to make a succession. After they have done flowering, turn them out of doors and expose them fully to the sun, that they may ripen well. In case of heavy rains, the pots should be turned on their sides, so as to keep the bulbs somewhat dry, and, to the same end, diminish the watering gradually, until they become quite dry. Then cut off the stems, and store the pots away in some dry place out of doors until

next season. In the following February they may be turned out of the pots, the finest bulbs selected for pot cultivation, and the rest planted out in a prepared reserve bed of soil in the garden. The soil of this bed should be about eighteen inches deep and rather sandy.

Some of these bulbs, after a year's growth, will be strong enough to transplant for flowering into a bed in the flower garden, when they will prove, for late flowering, one of the most attractive of groups. The soil of the bed should be prepared for them after proper drainage is secured. A similar compost to that recommended for pot culture may be used, and plenty of rough material should be mixed through the mass. The bulbs should be taken up every season, for the purpose of removing the offsets, when they may be planted again, and the stock be put into the nursery beds until they become flowering bulbs. By following these rules, a sufficient quantity of flowering bulbs may be obtained in three years to have a bed of each sort. The best time for planting is the end of February or early in March; but it must be before the bulbs show signs of growth. In arranging a mixed bed, the strongest bulbs of the varieties *speciosum* and *punctatum* should occupy the centre; then the strongest of the variety *album*; next the second size *speciosum* and *punctatum*; and then the smaller bulbs of *album*, which is the dwarfest grower.

WATER SCENERY.

(Continued from page 296.)

RUSTIC waterworks may be introduced in rustic scenes very appropriately, but to dispose rustic forms and proportions with propriety and effect demands quite as much taste and judgment as the plan of a grand architectural fountain. If a supply of water can be obtained for a portion of the ground appropriated to ferns, rockeries, and green recesses, it can be made much of, both for the greater display of the sparkling stream and for assisting such of the plants as require it, by leading it about in the form of a rivulet down a succession of cascades, terminating in a rocky pool at the outlet, and this rocky pool may be made bewitchingly beautiful by planting it with burr-reeds, flowering rushes, lady ferns, osmundas, arundos, and other elegant aquatics. Happily, for the possessors of villa gardens, there is no need to call in an architect or engineer for advice on any waterworks of moderate pretensions, for the fitting of a fountain, according to the laws of hydrostatics, is a matter within the capacity of any respectable plumber, and the ornamental work may be obtained in imperishable stone, in any and every style, from the most severely classical to the most grotesquely rustic, and sheets of patterns may be obtained through the post by asking for them, and supplying a stamp to frank them through.

It may be well here to say, that for a fountain there must be a reserve of water at a higher level than the fountain itself. In towns this is easily accomplished by constructing a cistern in some elevated part of the residence, and securing a supply to it from the ordinary water-pipes. Then from the cistern there must be another service to the fountain. If the house is far removed from the fountain, it will be better to place the cistern on the summit of a tower, shed, summer-house, or other structure, as the longer the supply-pipe the more will the play of the fountain be lessened by friction; for though water will always rise in a pipe to the level of the point of departure, it requires time to do so, and friction reduces the rapidity of the flow, and hence the force with which a fountain will play cannot be determined solely by the difference of altitude between the jet and the cistern. If the supply-pipe is one hundred yards in length, the height of the fountain will be reduced one foot below what it would attain if the supply were close beside it. Suppose that, according to the respective levels of the jet and the cistern, a fountain ought to rise ten feet, we have only to remove the cistern to a distance of one thousand yards to nullify the whole effect of the descending force of the column of water, and, consequently, destroy the jet altogether. To determine the adjutage is easy enough by experiment with a leaden nozzle, which can be pressed or opened to the dimensions found to suit the circumstances, and this course is absolutely necessary where the engineer has no ready means of ascertaining the power of the head. As a rule, the adjutage, or opening of the pipe, should be one-fourth the size of the pipe itself, but every fountain should be supplied with a series of adjutages to produce different forms of jets, as the force of the head may vary, or as the caprice of the possessor may determine.

To increase the force of a fountain it may be placed at a comparatively low level, yet the lower the level the less is its dignity, and it is generally much better to adapt the head to the level than the level to the head, for a fountain constructed with taste is too expensive and important an affair to be placed anywhere but in a conspicuous position—that is, if it is to form any part of the garden scenery. Once set the stream flowing, and it may be turned to many uses after it has splashed and glistened in the form of feathers, baskets, parabolas, and true-lover's knots; the outflow may be arrested at points where water is required for strictly horticultural purposes, to save that everlasting fetch-and-carry which is the bane of many an otherwise good garden, and after that the wilder parts of the ground may have the benefit of a rill where water-cresses would grow and the robins would wash themselves.

There is only one position proper for a pond in a garden, and that is somewhat remote from the house, and on the lowest level of the place, where it will naturally receive much of the rainfall. A pond is a miniature lake; it must be in the natural style, no matter what its size or shape, and hence costly architectural accessories are not needed. In choosing a site for the pond, give preference, if possible, to a position where two or more walks meet at the junction of the dressed grounds with the wildest portions of the scenery. In

marking out the boundary, throw the greatest extent right and left of the principal approach to it or the principal view of it. Suppose, for instance, that the walks lead from the terrace or dressed lawn through a belt of evergreens towards the wilderness, at some point in this progress the pond will appear in the scene; and on the side next this approach it should be so extended as to show the greatest possible extent; and the whole of the planting of a nature to obstruct the view should be on the margin most remote from this first and principal view.



Fig. 1.



Fig. 2.

Suppose our principal view is from A (Fig. 1), which we will consider to be the site of an elevated part of the lawn, to which we resort for a view of the country. If the pond extends its greatest diameter from B to C, the eye has the fullest range of its boundaries—none of its extent is lost. But suppose the longest diameter happens to be as in Fig. 2, then, however spacious the extent of water, it is foreshortened to the eye, and appears smaller than it really is. But to destroy the severe formality of right angles, the general direction of the foreshore may be oblique to the line of vision, without loss of space, provided the obliquity is not at a low angle, and the form of the whole is irregular. This may be illustrated by a sketch from a pond made by us, a few years since, in a garden in a very pretty western suburb. Instead of a circle or a square, we bent the pond round upon itself, so that the whole extent cannot be viewed from any one point. The margin next the principal view was left quite open, so as allow the whole of the surface of the water to impress its character on the scene. The planting on the open side was arranged so as to partly obstruct the view of the distant village, which now appears as if set in a frame-work of leafiness.

It is needful that a few practical remarks should be made in reference to the earth-work of a pond. When the site, size, and shape of the pond have been determined, a dead level must be marked on stakes placed at a few points of the boundary, and to this level all work must be regulated, no matter what the intended depth, or what the variations of that depth in different parts of the same pond. We can illustrate the necessity for making a dead level by a case that lately came under our observation. A landscape-gardener marked out a place for a pond in a very pretty place he was engaged in planting and decorating, and the superintendent of the works, a man well experienced in every branch of horticultural industry, trusted to guess-work instead of using a spirit-level in taking out the stuff for the pond. The result was, that when the first heavy rainfall came the pond filled, and was about one inch deep at one end and five feet at the other. It had to be emptied, the outfall

pipe raised, the bottom lowered, and the whole of the banks lowered from nothing at the deep end to five feet at the shallow end, which you may be sure was a much severer task than first lowering it properly would have been. Suppose the workman makes an excavation, if he is working to a dead level, and the result is the line A B. Now



let the water into the pond, and the result is the line c d. Under some circumstances it would appear as if the water in this case lay all aslant. This necessity for a dead level is a separate affair altogether from the scenery of the banks; for the banks may rise into knolls, steeps, mounds, or what else, with the greatest propriety, and, in fact, it adds very much to the beauty of a sheet of water if it is enclosed on one side by shelving banks and rising grounds; but these may all be considered in the first instance in relation to the dead level, which the water will always present, and the excavation for a pond must be conducted with a view to that dead level from beginning to end.

Another matter calling for remark is, as to supply and waste. If placed in the lower part of the grounds at the time the drainage is effected, all the drains can be made to converge to one main, which will convey the water to the pond. The outflow should be on the opposite side, to convey the water to a lower level. The level of the water will be determined by the position of o, the outfall, and



this will be determined by the highest point to which the supply, s, can be carried, and this highest point must of necessity be the lowest in the whole set of drains in communication with s. The larger the pond the greater must be the difference between the level of the supply, s, and the outfall, o. If these approximate too closely to a dead level, then the flow will be so sluggish that the water will soon get foul. There is always one resource available for remedying defects of level or supply, and that is, to raise or depress the outfall, so as to quicken or slacken the flow of water towards it, and to secure the possibility of altering the outfall at any time there should be a quick fall from the outlet to the drains, brooks, and ditches that are to receive the waste.

(To be continued.)

WINTERING HALF-HARDY PLANTS.



ANY persons fill up the spaces in gardens or shrubberies left purposely blank, or become so by the failure of seeds, with geraniums, calceolarias, pelargoniums, verbenas, and other plants which thrive well in the open air in all parts of the kingdom during summer, but will not survive the winter except in the West of England. Many others would adopt the same course, were it not that these plants, even when of inferior quality, are dear to purchase, the good sorts being far too expensive.

Most of the plants available for this purpose are easy of propagation by cuttings of offsets, but the difficulty is to preserve them over the winter, when no greenhouse or conservatory exists; for keeping plants of any sort in rooms is unhealthy, besides that they harbour dirt, and the practice is attended with inconvenience in other respects.

For small gardens the pot culture insures a succession of plants in flower through spring, summer, and autumn; those that become exhausted being successively removed to make place for others. But, as small gardens are generally attached to small houses, which have no conservatories with stove-heat, the inconvenience of winter keeping the plants deters numbers from adopting this course.

We are indebted to our very excellent contemporary, *The Gardeners' Chronicle*, for the following instructions for winter storing plants, which completely obviates the difficulty so generally complained of on this point. By the exercise of a little ingenuity, under the advice here given, sufficient stock may be preserved to insure a succession of those beautiful flowers denominated half-hardy. We are the more induced to borrow our contemporary's remarks because we have received several inquiries on this head, and that instructions derived from such authority will command more respect than any that we have the ability to produce:—

“Two principal conditions are required in the construction of a winter house—first, *dryness*; and second, *exclusion of frost*. If these are fulfilled, other circumstances are comparatively unimportant; if they are neglected, plans the best constructed otherwise are entirely valueless.

“The most perfect of all structures is a glazed brick pit, with the walls built hollow, and the sashes protected by a movable covering of thatch, or asphalte, or matting. The two former are the best, because they are the driest; the first is the best of all, because it is the warmest. But such a structure will be worse than the rudest substitute if it is not so completely elevated from the surrounding ground as to be free from the damp that during winter will necessarily rise upwards into it. The bottom in the inside should be at least a foot or eighteen inches above the ground level, or, if circumstances should render this impossible, a well-drained dry-ditch cut round it will answer the same purpose. It ought,

moreover, to face the north. If it faces the south, the air within is apt to become heated by the sun, and thus the plants are stimulated into temporary growth at unpropitious seasons.

“The necessity for a winter-house being dry seems to arise out of the nature of vegetation, which being entirely passive cannot resist the influence of the surrounding media. If the air or soil is damp, plants exposed to them must absorb that moisture; but, from the lowness of the temperature of a winter-house, their powers of digestion and assimilation are torpid, and, therefore, the water they receive, instead of becoming impregnated with their system, stagnates in their cells and cavities, where it becomes putrid; and as soon as this takes place, the evil extends with rapidity, causing both branches and stems to become rotten, for decay in plants is always contagious, and will spread through all the parts with which it is in contact until the renovated forces of vegetation restore the equilibrium of chemical constituents, and thus arrest contagion.

“If the sides of such a pit are not hollow, it will be necessary to guard them by an external covering or lining; and even if they are hollow, it may be necessary to do so in very severe winters. It is essential that the material to be thus employed should not be liable to fermentation, and should be as dry as possible. Stable litter, grass mowings, tan, decayed leaves, are all bad materials. Dry straw, fern stems, or boughs of fir-trees, are good materials, and so is a mound of earth, a foot or eighteen inches thick, sloped so as to throw off rain. If fermenting materials are employed, they are sure to raise the temperature of the pit, and thus to raise the powers of vegetation, which it is essential to guard against.

“The plants which are to be preserved in such a pit should be taken out of the ground and potted in the dry weather of October,* and they should be exposed for a day or two to the sun before they are finally arranged within it; that is in order to render them as dry as practicable before they are housed.

“Supposing all the above-mentioned precautions to be taken, it will only be necessary to open the sashes in dry weather for the purpose of dissipating any further moisture that may collect; light should, however, be admitted, where it can be done without exposing the plants to frost or rain; but if they are quite torpid, as they ought to be, they may remain shut up for weeks together.

“Such being the best kind of hybernatory, it will not be difficult for a gardener to devise substitutes for it. He who has no glazed pit with hollow walls, may easily make a winter-house with very rude materials. The walls may be made of earth, provided they are thick enough, and the roof may be of thatched hurdles, or, what is better, of oiled linen stretched on a wooden frame and guarded by thatch; or the walls may be formed by two rows of hurdles, having the interval between them stuffed with dry straw or fern. In such buildings pelargoniums, verbenas, and all such half-hardy plants required for the decoration of borders may be safely stowed away; and even Alpine plants, which are in a growing state during the

* The early part of this month will do, or any time before frost.

winter, might probably be so preserved. It would, however, be better to keep them apart, because they might suffer from too much dryness.

“Let us not, however, be misunderstood in the sense in which we use the word dryness. We do not mean that the soil of plants in a hybernatory is to be as dry as dust, or like that of a sunny hedge in the dog-days. We mean that it is not to be wet, or even damp enough to engender mosses and green scum, or by its evaporation to render the walls perceptibly moist. If the soil is dried up, it will kill the plants enclosed in it; but no person can be a gardener who will not now understand what we mean; nor is the over-drying the earth likely to occur when plants are exposed to the ordinary atmosphere, even if enclosed in such pits as we have described; for the soil, though originally too dry, will gradually absorb the moisture of the atmosphere that acts upon it. Perhaps it would be even possible to winter half-hardy plants by packing them in a chest kept in a dry and frost-proof chamber, arranging them layer upon layer, resting on crossbars so as not to touch each other. If this was attempted, it would, however, be necessary that no packing should be introduced between the pots, for it would become mouldy, and that would destroy the plants. Nor could the chest be preserved in a kitchen corner, as has been suggested, for that would be too warm. The chamber to hold them should be frost-proof, and no more. We cannot, however, recommend this expedient, because, although plants might thus live through the winter, they would probably perish on the approach of spring. At that season, and long before the frosts are gone, it would be necessary to expose them to light, and to give them water upon which to feed, and frames of some sort would be required for that purpose. Now if there is a frame of any sort in the gardener's possession, he may just as well fill it with plants during winter in the way pointed out, as leave it empty and pack up his plants in boxes. Oiled linen would do very well for sashes.

“As space is often a great object in a garden, where there is seldom much room allotted to hybernatories, we may as well add that, instead of taking up half-hardy plants, and attempting to preserve them, it is better to leave them in the borders to their fate, and to propagate pans full of cuttings of such things early enough to be well rooted by the end of September. Cuttings thus prepared may be inserted in their frames, and in this way thousands of plants will only occupy the space of fifties.”

By the help of the above directions any person may contrive to make a hybernatory of a size and of materials suited to circumstances, and thus, without the necessity for stove-heat, preserve sufficient varieties to fill up his borders in the summer with plants of the choicest description. In small gardens the plants—particularly calceolarias, etc.—should always be retained in the pots, and plunged; this is the best practice, even for extensive shrubberies, for if the roots are allowed to ramble they do not flower so freely, but run to wood and foliage, and will seldom survive repotting in the winter.

ROOT-PRUNING.



T is one of the most common of all things, to find trees of every kind unproductive of flowers, although in a state of robust health; this excites surprise. But a rank foliage and coarse shoots are not better evidence that a tree is in health, than a red face and corpulence in a man; in both cases it shows that the individual eats and drinks too much, and should commence an all-excellent remedy in both cases. In plants there is no mode of obstructing the tendency in luxuriance but by crippling the roots; for with the atmosphere and its action on the vegetable system we cannot deal in the open air.

It does not much matter at what period of the winter this operation is performed, so that it takes place before the fall of the leaf, and the swelling of the buds in spring; but it is better to perform it before the end of November.

The roots should be cut through all round, and undermined in proportion to the size of the head. A tree between eight and ten feet high, may be cut to within three and a half or four feet of the trunk; but care should be taken not to approach much nearer; because, although the tree is not likely to be killed by the operation, yet it may be so much stunted as to bear a too scanty foliage in the succeeding season. But even if this is done, the tree will recover by the following year.

No one who has neglected to observe the effect of this practice can form an adequate idea of its importance if steadily persevered in by removing it whenever the trees are becoming coarse wooded. Dr. Lindley accounts for the effects by the following theorem:—“If the roots of a plant are large and numerous, the head must be so too, for this plain reason, that the amount of fluid food received by a plant is in proportion to the size and extent of its roots, and that food must be expended in the formation of branches. There can be no interference with such a law as this. Suppose one tree absorbs 20lbs. of fluid food, or sap, and the other 40lbs. by the roots, all other circumstances being equal, it is evident that the one will have twice as much organizable matter as the other; and as such matter cannot be returned back into the soil, but is irresistibly driven upwards by the force of vegetation, it can only be expended in the organization of leaves and branches; consequently the leaves and branches will be twice as large, or twice as numerous, in the one case as in the other. Of course, the reverse of this is equally true.”

By this reasoning, the correctness of which cannot be doubted, it appears that we have at all times the option of limiting the growth of a tree to any size desired; and it is by carrying root-pruning to a great extent, that the Chinese produce the dwarf trees which excite so much astonishment in Europe. But the process may be adopted with advantage in many other cases besides fruit trees, in creepers, for instance, which it is desired to confine within a certain compass.

WINDOW GARDENING.

BY JOHN R. MOLLISON.

(Continued from page 301.)

FILMY FERNS IN CASES AND UNDER BELL-GLASSES.



THIS is a class of ferns well deserving a chapter all to themselves; their delicate membranous texture and love of shade and moisture requiring a mode of cultivation altogether different from the other kind of ferns. Their fronds when held up between the eye and the light appear so delicately transparent that their simple internal structure is revealed to the naked eye more clearly than in any other kind. They cannot be cultivated in rooms unless in a close, well-made case. The Warrington case I consider the most preferable. It differs from the Wardian case in having the lower part filled with water, combining a fern case and aquarium in one. The presence of water in the lower part causes a steady moist atmosphere which filmy ferns naturally delight in. It is only in a case of this description that they feel at home. In their natural haunts they love to creep among the dripping rocks near a waterfall, where shade and constant moisture is kept up; so unless you can contrive to keep up the same conditions of atmosphere, there is little chance of your being successful in their cultivation. They are so thin and delicate, that a few minutes' sunshine or dry air causes them to shrivel up and die. Still a fair amount of light must be allowed as long as the sun does not reach them.

I do not think there is anything in connection with window gardening of such absorbing interest as the cultivation of these beautiful ferns, and any one may well be proud if successful in growing them as they should be grown, for they are extremely beautiful and interesting.

A Warrington case being partly an aquarium, it is necessary to raise above the water small rocks and islets of burrs or artificial stone, having hollow crevices filled with soil in which the plants may grow. Other suitable rests may rise from the bottom on which to stand pots and earthenware baskets. Pots and baskets hanging from the roof and earthenware baskets at the sides complete the internal arrangement. But here let me impress upon you the absolute necessity of having ample drainage at the roots of your plants, and always in good working order, to allow the water to percolate freely away through the soil, for though filmy ferns require moisture as a necessity of their lives, they cannot endure the evils of stagnation. In fact, if the drainage at the roots is ample and good they cannot suffer from excess of moisture. A dry atmosphere is their death warrant; there is nothing that will hurt them sooner. Used to the damp, dark crevices of rocks, where the sun never

shines and the drought of summer is never felt, they perish at once in a dry atmosphere; and even if relieved in time to prevent their death, they are robbed of their beauty for an entire season, their beautiful membranous fronds shrivelling up as before the breath of a furnace. Sunshine is nearly as disastrous in effect as drought, a few minutes of a warm sun being sufficient to scorch them up.

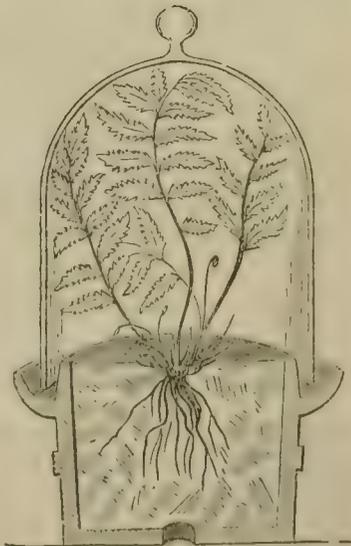
In hot dry weather they should have several vapoury sprinklings of tepid water during the day. In cloudy weather, when the circulation of air is less active, one or two sprinklings will be sufficient. Syringing should never be attempted in their case; a light vapoury sprinkling or dewing is the proper thing, and a small watering-pot with a very fine rose will do it nicely.

The same soil as recommended for ferns in the previous paper suits the filmy ferns well, but lumps of sandstone should be added, as they love to cling with their roots around the stones. Some of them prefer clinging moss-like to open porous blocks of sandstone, or lumps of charcoal, to growing in prepared soil. In potting them in pots or planting them in earthenware baskets, never neglect to give them plenty of drainage. One large crock over the drainage hole and a handful above it, with some sand knobs added, and a largish lump of sandstone in the centre for the roots to cling to, will be sufficient. It is a very good plan to cover the drainage with a little moss before putting in the soil, which will prevent the water from washing the soil down into the drainage and choking it up.

Under bell-glasses the filmy ferns thrive very well if the same attention be paid to them as when in the fern case, for it acts on the same principle. A large earthenware pan is the proper thing to choose, with a bell-glass to suit. The ferns should be planted out in the same soil as that recommended for case ferns, with several largish lumps of open sandstone for them to cling to, and to aid the drainage, which must be ample and properly put in. Before putting the soil into either pots or pans examine it well, in case small worms or other vermin may be lodging in it. They cause much mischief if allowed to remain.

Cases and bell-glasses require very little ventilation. A small hole in the knob of the bell-glass is sufficient; while for the case, if the top glass is put loosely in, the small quantity of air admitted through the crevices will cause quite sufficient circulation. Never give any air by the bottom of the case or bell-glass, for air given that way causes chilling draughts; always give air by the top when you do give it.

Air need only be admitted once a month, and watering may be done at the same time, which is often enough. All you require to do is to take off the top of the



case, and during the time you are watering and wiping with a cloth the inside of the case all round, sufficient air will have been admitted. The water you use must be soft and of about 70 degrees of heat. A very good way to water pots and pans with ferns is to immerse the bottom in water for two or three seconds, and the water will then ascend by capillary attraction through the entire ball of the plant, and a more decided watering will thus have been secured. Some advocate keeping filmy ferns entirely closed, but that idea is erroneous, especially in the management of the Warrington case. A gentle circulation of air must always be provided for them, especially when the temperature is low, owing to the great amount of moisture in the atmosphere caused by the presence of water.

As the Warrington case is the very best structure for growing the British and foreign filmy ferns, a choice list will enable my readers to select the best for their purpose. The *Hymenophyllums*, *Trichomanes*, and *Todeas* are the special favourites. Some of the New Zealand and American kinds are very lovely, though they are seldom seen in the hands of amateur cultivators, although the same treatment required for the commoner kinds, such as *Hymenophyllum Tunbridgense* and *Trichomanes radicans*, will suit them very well. Of the *Hymenophyllums* we have—

Hymenophyllum Tunbridgense, choice British species found in the neighbourhood of Tunbridge Wells; hence its name. It has a matted tufty creeping growth, the fronds being from one to six inches long and of a dull brownish green.

Hymenophyllum unilateral, another British species, of a dense tufted growth, the fronds averaging from two to four inches in height, and brownish green in colour. These are the only wild British filmy ferns, and are always found together.

H. caudiculatum, with large light green fronds.

H. chiloense, an exquisitely beautiful, small, densely tufted species, with yellowish-green fronds.

H. flexuosum; this species is as like a *Selaginella* as a fern; it has lovely crisped wavy fronds.

H. pulcherimum, a New Zealand species of a large and strikingly handsome appearance; the fronds are elegantly divided and of a yellowish-green colour.

HINTS ON CULTIVATING HEART'S-EASE.



F beds for the spring crops are not made early in this month, it will be too late, and better to postpone the matter until spring. The plants can, in the meantime, be kept in pots; and the intended ground, if well trenched, will have the benefit of the winter's frost. If the season continue mild, however, the plants may be placed in their beds any time before the middle of October; for it must be borne in mind, that they can now be bought of growers *stronger* and

cheaper than in the spring, when the demand is general. By all means select plants of first-rate character, if you indulge the intention of producing new varieties; without this precaution you will only be toiling in the rear of others, and fortunate if you effect what they have accomplished three or four years ago. We have before stated that neither cold nor frost will injure pansy plants; even the striking which have not rooted, when left in the pots, will survive the hardest frost if kept dry and sheltered from the cutting easterly winds. The pansy is injured by wind at any season, but in spring or winter it would be fatal; and when it occurs from a cold quarter, some shelter should be afforded, either in the form of screens, litter, or pots. Those who desire to produce new varieties, having procured a sufficient number of plants of approved shape, diversity as to colours, and good character for shrubby growth, may class them according to fancy, and if no inferior plant is admitted into the bed, every seedling that appears (and the best seeds are often shed) may be preserved and pricked out as soon as it attains four leaves. Or if the old plants are left to ripen, they can be cut down about Midsummer, a plentiful crop of seed harvested, leaving still sufficient to cover the ground, and then, by removing the original plants, you will have a bed of seedlings, after thinning out in spots where they are too thick; and this is the plan that many growers pursued, being attended with little trouble, and producing blooms the same year. We do not advise the use of manures in the raw state. We have tried every sort, we believe, natural and artificial, and experience proves that nothing surpasses leaf-mould, well rotted, and mixed with a little garden loam and cow-dung, then laid in a heap, turned over repeatedly, and screened and riddled before being laid on. A thin covering of this occasionally, when the earth is stirred, will freshen the plants amazingly; but a good airy situation is essential to surpassing excellence in the culture of this or any other flower.

Cuttings taken from a mildewed or otherwise diseased plant, will seldom strike roots, therefore it is a waste of time to attempt to propagate under such circumstances. We are not aware that any writer has given instructions for eradicating mildew—a great omission on the part of those who have published on the subject; for the pansy is particularly liable to that disease, and it is so contagious as to spread over a whole ground in a short time. We have an impression that the use of *raw* dung induces the mildew, and also the rot of the stem, and our application of bone-dust proved most detrimental. Sulphur powdered liberally over the plant, is the only cure we know of.

Cuttings may still be taken from vigorous plants that have a superabundance of foliage. They are best from the side, and those that have not borne blossoms should be preferred. At this late season they should undoubtedly be placed in pots, taking care to press the earth firmly about the bottom of the stem, leaving no void, or it will rot. The pots may be placed in a sheltered spot, and in very cold weather either covered over or removed to a frame or out-house, giving them plenty of air at all times; they will root

early in the spring, or before, if the weather is open, and make good plants in the summer. Offsets may still be taken and placed in the position they are intended to bloom, particularly if they have strong roots; but, as we have repeatedly stated, they will not make such fine plants, or produce such choice blossoms, as strikings.

THE FUCHSIA FROM SEED.



THE object of most persons who cultivate plants of this kind from seeds, being a desire to obtain some new variety of superior quality, more than that of increasing the number, the greatest care should be observed in selecting seeds from the best varieties as the surest means of success. Form is one of the principal properties to be studied; if in the light class, choose those that are of the purest white in the tube, and sepals stout, broad, and well reflexed, so that the corolla, of whatever shade of colour it may be, is fully in view, and well expanded. As the above properties are not at all times to be found in one variety, assistance may be obtained from a second or third kind, possessing in a greater degree that property which may be deficient in the first selection. For instance, suppose a flower to possess a remarkable fine tube and sepals, but is deficient in the corolla, then select one that has a fine corolla, and from the latter take the pollen, and apply it to the stigma of that which has the first-named two properties most perfect. When the seed is ripe the berries should be gathered, break them between your fingers, and wash out the pulp; this done, spread the seed out thinly on paper till dry, when it may be put away till the proper time of sowing, which is in the beginning or middle of March. Sow in pots or boxes, and as soon as they are an inch high, transplant them into small pots, shifting them into larger as often as they may require till they flower; but it may be observed the plants will flower in sixty size pots, and where room is an object, they may be allowed to remain until they show flower, and any that promise well be then shifted and encouraged by more root room and good soil, which should be composed of loam of a mellow quality for one half, and equal portions of well-rotted horse-manure and leaf-mould forming the other half; if the loam be too strong, add a little silver sand to reduce it. The whole should be well mixed together before using. Having remarked on the light class of fuchsias only, let it be understood that the same practice will apply to the dark kinds; which of the two is to claim the palm, I am at a loss to decide. Both beautiful, both admirable, I can only say with the poet, "Happy should I be with either, were the other dear charmer away."

THE MICROSCOPE AND THE FLOWER GARDEN.



THE flower garden is but too often valued merely as an ornamental adjunct to our dwellings; sometimes for the more obvious beauties of its individual treasures which may delight the eye by the elegance of their forms, the brilliancy of their varied hues, or enchant the senses by their delicious odours, or, it may be, for the healthful exercise afforded by the different manual operations connected with gardening; but in how few instances are the inhabitants of the parterre regarded as so many sources of the highest moral and intellectual gratification. Few persons are nowadays ignorant of the important aid which the science of natural history has derived from the microscope, and we desire, in the following brief and simple outline, to point out how this instrument may be made available in the flower garden, as a means of mental culture and of amassing a store of facts of the most interesting character. The too general disregard of this valuable auxiliary of modern science, seems chiefly attributable to the generally received opinion that the microscope is not only an expensive instrument, but that it demands much time, attention, and nice manipulation. And if the compound microscope be employed, these are certainly conditions which must be fulfilled; there is, however, but little necessity, except in very minute investigations, to make use of the high magnifying powers with which we are thus furnished.

For all ordinary purposes, the well-known Stanhope lens, which is one of the cheapest and most powerful single microscopes that has yet been proposed, is sufficient, and it is to this simple instrument that reference will alone be made in the course of our observations.

Perhaps, before directing our attention to the more showy occupants of the flower garden, we may be allowed to digress for a moment, to examine a plant belonging to a very humble division of the vegetable kingdom, viz., the Hepaticæ, or liverworts, this plant being termed by botanists the *Marchantia polymorpha*. It grows abundantly on damp rocks and walls, presenting the appearance of a firm green-lobed crust or expansion, studded with little conical elevations, at the apex of each of which is an oval orifice, communicating with a very curious breathing pore or stoma, the letter being formed of five cellular rings, overlaying each other.

But the parts of the plant to which we would more particularly direct the attention of the microscopic observer, are the little urns or receptacles which arise from different points of its surface, and the edges or brims of which are fringed with a row of transparent, delicate teeth. These urns contain a number of minute, flat, and almost circular bodies, which, viewed by the Stanhope lens, are very beautiful objects. They are regarded by botanists as buds of gemmæ, which, to use the language of Dr. Carpenter, "separate spontaneously from the parent structure, and develop themselves into new beings; and as, when mature, they are liable to be washed out by rain, and to be carried to different parts of the neighbouring

surface, and as they grow rapidly whilst supplied with moisture, the rapid extension of the plant, under such circumstances, is readily accounted for."

This plant is not, however, propagated solely by these disk-like buds; it being, in common with the whole class of Cryptogamia, or flowerless plants, to which it belongs, multiplied also by minute seeds, or, properly speaking, *spores*, contained in cases arranged radially, or like the spokes of a wheel around a central body, termed the *pelta*, or shield, which is mounted on a long stalk. The curious structures which are thus displayed by one of the most common of the liverworts, and which, as we have intimated, may be easily studied with the aid of any good single microscope, are well calculated to impress the mind with the philosophical truth embodied in the seeming paradox of a French writer, "that if the Author of Nature is great in great things, he is exceedingly great in little ones."

We would gladly linger among the Cryptogamic plants, and point out, amongst other marvels, the minute and wonderful anatomy of the reproductive organs of the fern-tribe, particularly of that division of the class termed by botanists, *annulate*, and of which the common Polypody (*Polypodium vulgare*) may be taken as an illustration. If we examine a leaf or frond of this plant, we shall find that its back is studded with a number of round, green or brown prominent spots, which are named by botanists, *sori*.

Each of these *sori* is composed of a vast number of minute capsules or thecæ, which arise from the surface of the leaf, by very short and slender footstalks, each capsule being filled with spores, and furnished with an elastic ring or annulus, the office of which is, by rupturing the capsule when it arrives at maturity, to scatter the spores or seed-like grains in every direction. And it is an interesting experiment to place a few of these, when nearly ripe, upon a sheet of paper, exposed to the direct rays of the sun; and, as they become dry, to watch them with the microscope, ejecting on all sides their innumerable germs. We cannot but admire this beautiful application of a mechanical law to effect the dispersion of the sporules; indeed, if such a provision had not been made, it is far from improbable that many of the species would have long since been extinct; seeing that, if in an artificial propagation of ferns, by sowing the spores, the latter be allowed to fall too thickly on any spot, the young plants to which they give birth soon interfere with each other's growth, or, in the language of gardeners, "fog," so that under these circumstances but few arrive at maturity. How simply then, and yet how wisely, has Nature guarded against such a contingency!

If from this digression we now turn to that division of the vegetable kingdom to the illustration of which our paper is more especially devoted, viz., the flowering plants, we shall find proofs equally interesting with those already adduced, of the most admirable contrivance and design.

Professing then to write only for those unacquainted with botanical science, and the use of the microscope, we will select for

examination a plant belonging to the well-defined natural order or tribe, the Compositæ, or compound flowers, of which the French marigold (*Tagetes patula*) may be taken as a common and instructive example. It will be observed that within the dark green cup which forms the exterior whorl (*involucrum*) of the flower-head, there are several florets having a broad yellow strap-shaped expansion striped with brown, then constituting what are called the ray of the flower-head. The little tube in which each terminates, encloses a slender forked body, the style, which is well seen with the microscope, as are also the minute hairs (*calyx*) that encircle the base of the tube. But the parts of the flower-head more particularly to be noticed, are the florets which are within the ray, and which are termed collectively the disk. Upon removing one of these florets, we observe the two beautiful *stigmas*, or terminations of a central column or *style*, this style being enclosed in a little cylinder, which our microscope shows to be formed of five oblong bodies or *anthers*, united together by their edges, and which contain the fertilizing granules called pollen. The style arises from the summit of an oblong capsule termed the ovary, in which, upon opening it, we find a single ovule or young seed, and crowning the ovary are a few serrated hairs or scales resembling those of the ray florets.

In many of the plants of the same order this appendage or pappus is an extremely beautiful microscopic object. That of the dandelion is well known, and in the pretty *Catananche cœrulea* it will be found equally interesting. In the genus *Valeriana*, the hairs composing the pappus are at first rolled inwards, but as the seed ripens they expand and assist in wafting the fruit. The common annual *Kaulfussia amelloides* has the pappus of the ray florets so divided as to present the appearance of a fringe. The anthers of many plants are highly attractive, both from the variations of their forms, and the different modes in which they open to allow the pollen to escape. In the Oleander the anther terminates at its apex in a long feathery prolongation, and is divided at its base into two lobes, which diverge so as to present an arrow-like appearance. In *Gaultheria procumbens*, a North American shrub, each of the pointed anther lobes is divided into two horns, the entire anther thus having a four-forked aspect. *Erythraea aggregata*, a pretty little plant of the Gentian family, presents us with a curious example of the twisted anther; in *Commelina celestis*, the three barren stamens have a highly singular form, differing greatly from the fertile ones; and in *Rhoxia*, a North American genus of melastomaceous plants, one or two species of which are sometimes found in English gardens, the anthers are bent in a very unusual manner, and have a small spur at their base.

In the genus *Tupa*, formerly included in *Lobelia*, the anthers are densely hairy, and the filaments of a considerable number of plants, among which we may mention *Salpiglossis* and *Erythroluna conspiciua*, the scarlet Mexican thistle, are also more or less pubescent, and present a beautiful appearance when viewed through the Stanhope lens. In the majority of cases the pollen is discharged by

longitudinal openings, but in the Heath order, to which belong the azaleas, rhododendrons, and ericas of gardens, the anthers open by pores, generally situated at the apex.

In the barberry, each lobe opens by the valve, which rolls up from the base to the apex, while in some of the laurel tribe there are two, each separating valves for each anther lobe, or four in all. If from the anthers themselves we pass to their contents, we shall find ourselves transported to a fairyland peopled with objects of the most elegant and interesting forms; and although the pollen dust of some flowers is extremely minute, and requires a high power for examination, yet, with a good Stanhope lens, we shall be able to advance a considerable distance into this enchanted region.

Among the more remarkable forms assumed by the pollen grains we may mention those of the passion-flower, ipomœa, sunflower, and chickory. In the first-named plant the grains are nearly globular, covered with an elegant network, and opening for several *opercula*, or lids, to allow the protrusion of the pollen tubes. In the sunflower, the grains are also spherical, but are studded with pine like processes; and in the chickory, the granules are polyhedral, having as many as fourteen facets. In the phlox, the figure is triangular, each angle being terminated by a ball, and in nearly every plant, something remarkable will delight the eye of the beholder.

The central column or style and stigma of most plants will amply repay the trouble of microscopic examination. What a beautiful object it presents, for instance, in the well-known periwinkle, in the violet tribe, and in the common aster! In the last named plant, the style is terminated by two processes or horns, covered with hairs, the stigma itself being on the inner side of the fork, where it may be easily seen by the aid of the lens. The asteroid section of the composite flowers, and indeed most of the plants of the order, are remarkable for their long style, which projects far above the anthers, and were it not for the collecting hairs, as they are termed by botanists, by which its branches are crowned, and which, during their development, carry up the pollen, and retain it until the stigma is fit for its reception, it is difficult to imagine how the young ovules could be fertilized. But in nature, every emergency is provided for.

The nectary or honey-pore, situated at the base of the petal of some plants, is a curious organ, which may be viewed to advantage in the common fritillary, in the allied genus *Cyclobothra*, and also in the beautiful *Nemophilas*, where the nectary assumes the form of a fringed scale.

The hairs of plants equally claim observation, some being forked, others toothed or branched, and a few are beaded, of which those at the base of the stamens of the common spiderwort (*Tradescantia*) are an interesting example.

Although apparently very humble organs, hairs perform a most important office in the vegetable economy; the absorption of fluid by the leaves being, in a great degree, effected by their agency; and they are further supposed to act as so many conducting points, upon the electricity of the surrounding atmosphere.

Few objects are more beautiful than the delicate spiral threads, which are easily seen in the foot-stalks of most leaves by gently breaking them across, and then carefully, and, to a slight extent, separating the parts. The leaves of the pelargonium, strawberry, vine, and asparagus, furnish interesting examples of this curious structure.

The spiral fibres are not always confined to the leaves and stem, being sometimes found investing the seed, as in the genera *Salvia* and *Collomia*. To view them with the microscope, it is only necessary, to cut off a small piece of the outer coat of the seed, and to place this in a drop of water on a bit of glass, when it will immediately throw out vast numbers of these curious bodies in every direction.

In concluding these brief and desultory microscopic illustrations, designed only, we are anxious to observe, for the uninitiated reader, we may be permitted to remind him that, in the vegetable as in the animal kingdom, every structure, however minute or humble it may appear, constitutes a link in the great chain of creation,

“All being parts of one stupendous whole,”

and that, in the formation and sustension of the minutest vegetable atoms, the beneficence and power of the Great Creator are as fully displayed, as in the wisdom that guides the planetary spheres.

INVADERS, VISITORS, AND SETTLERS IN OUR GARDENS.

(Continued from page 313.)

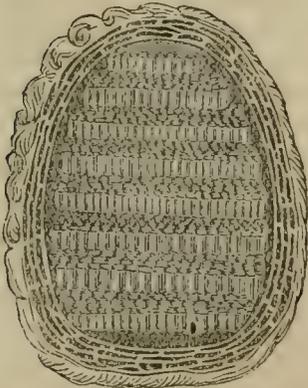


AMONG the different invaders of our gardens, there are none, perhaps, whom we are so unwilling to have there as settlers, as those near relations of bees—the wasps. During the spring and early summer, we perhaps forget all about them, just at the very time when they are so busy themselves in constructing their dwelling-places, and when too they are really serviceable to us, as we shall presently see; and it is only when they seem to appear on the scene as the natural enemies of the human race, that we begin to notice and dread the robbing and plundering propensities, and the fierce vindictiveness of our garden *rifle-corps* in its gaudy uniform of black and yellow.

Like the earwig, we after all give the wasp more credit for mischief than he deserves. He carries, it is true, a most formidable weapon—a sharp-pointed stiletto, which can be sent deep into our flesh, and a bag of poison, of which a single drop poured into the wound, can cause us hours, and even days, of pain and inconvenience. But has the wasp really any bloodthirsty designs towards us, or any natural desire to use his deadly weapons against us? Far from it. A wasp, in fact, only attacks and wounds us in self-defence. He has a natural desire, it is quite true, for the sweet juices of plums and nectarines, and other luscious fruits, and once having taken posses-

sion of the ripest he can find, if we should happen to want that particular plum or nectarine, and disturb him in his feast, knocking him roughly, perhaps, as we detach it from the branch—he treats us as marauders and invaders of *his* rights, and stings us. He comes in at our open windows, attracted perhaps by the scent of sugar on our tables, and if we attempt to do battle with him as he flies about in search of the sugar-basin, he will again sting us in self-defence. Let us on such occasions remind ourselves that during the former part of his life, before fruit was ripe or windows left open, the wasp was feeding on just the kind of matter that we are glad to get rid of, and that before his taste for sweets has come to him he has been performing the office of scavenger, and feasting on putrid and impure animal substances of all kinds; and should we like to exchange the feeling of enmity too often nourished against him for one of wonder and admiration at his powers and clever works, let us find out all we can of his curious life and ways.

Like bees and ants, the wasps we are sure to find in our gardens, live in communities, and have among them males, females, and neuters or working wasps. Their nests, too, which contain something like the combs of the bee-hives, are found in banks and hollow trees, and such situations as are selected by wild bees for their nests. The cells of wasps prepared for the reception of the eggs, from which the larvæ or grubs are hatched, and in which they are carefully fed by nursing wasps, and where they undergo the transformation into pupæ before becoming perfect wasps—these small cradles for their future population are formed, not of wax like the cells of bees, nor of any substance at all resembling it, but of a sort of paper made of fine sawdust. Just of such a substance as we manufacture of paper and call *papier-mache*, or mashed paper, are formed the comb of wasps.



SECTION OF WASPS' NEST,
showing layers of cells.

Instead of collecting materials from flowers and digesting it into wax, as does the bee, the wasp rasps off fine fibres of wood from any paling, dead tree, or gate-post that he can get at, and mixing it with some gummy liquid, which his own body supplies, makes a pulp, which he spreads out into thin sheets of paper, and first lining the walls of the round nest with many layers of these, afterwards with the same material forms the cells, which like storeys of numerous small apartments, fill up the nest.

The labour undergone by wasps in preparing their nests is even more wonderful than what is performed by bees within the hives which we prepare for them, and it seems to combine the mining and excavating power of the ant with the building talent of the bee, since the first operation towards the foundation of a wasp colony, is the hollowing out of a long horizontal tunnel in some bank, with a large oval cave at the end, sufficiently capacious to be fitted up afterwards with layers of the tiny cradles wanted for

the future population. The long tunnel and the large cave have both to be hollowed out with infinite labour by the gradual removal of the soil in the form of minute pellets carried in the wasp's jaws or mandibles, and which the cautious little work-people are careful to carry away to some distance from the mouth of the tunnel, so as to prevent the situation of the secret passage being detected, through an accumulation of earth near its entrance. Then paper-making begins, and more wonderful industry and perseverance in kneading and plastering, and when the walls of the large cave are lined and tapestried with many layers of paper, there comes into operation lastly the same constructing skill as that of the bee, in forming the tiny six-sided cells, crowded together so as to take up as little space and material as possible; only that as each storey of cells is placed across the nest horizontally and is separate from each other storey, and not joined end to end, as in the combs of bees, the cells are flat at the bottom, and there is no occasion for the three sided pyramid at the end of each, which is seen in the cell of the bee. The storeys in the wasps' nest are, in fact, placed one above another, as in our own dwelling, only that a space is left between each storey, in order that the worker wasps may get to the young broods in the cells—for the combs of wasps are never used for the storing up honey in, as those of bees. A most curious contrivance is adopted by the wasps, in order to secure the separation of the different storeys and the firmness of the whole nest. A little upright pillar of solid wasp-paper mortar is placed between each layer of cells, just as a human architect places pillars to support ceilings or roofs over large apartments or buildings.



PORTION OF
COMB, with
supporting
pillar, from
Nest of Wasp.

When the cells are filled with grubs, the attention of the wasp nurses to the young is equal to that of bees, but it does not appear that any substance like the bee-bread of kneaded pollen is formed for their food, but that the wasp brings home to the brood such food as she feeds on herself—probably after it has undergone some change in her stomach, and it may be that her avidity for sweet juices may arise from her desire to carry it home for the young of her community. And when the cold of late autumn has crept on, and the latest of juicy pears has been gathered, and windows never left

open, the life and labours of the wasp end together, the colony is reduced down to a few males and females, and a few workers, who contrive to survive the frosts of winter, to begin again in the spring the construction of a new paper city, and are too busy over their work to notice in the blossoms of our fruit trees the preparation for their autumn feasts. Shall we not after all bid them welcome to a share of the dainties for which Nature has given them a relish as well as ourselves?

In the form of the wasp with its slender waist, is seen very plainly the separation between the thorax or chest, and the abdomen or stomach, which forms one of the distinguishing marks of an insect, while in their lives, each individual passes through the three changes, which is peculiar to every other insect—first, the grub or larva;

then, the chrysalis or pupa ; and lastly, the perfect insect, such as the butterfly, ant, bee and beetle, in which last form the creatures never grow.

(To be continued.)

BREWING.

(Continued from page 319.)



WE shall now proceed to furnish a detail of the process, assuming that the quantities be brought down to those already mentioned ; viz., twelve gallons of ale and six gallons of table beer.

1. The MALT is to be ground either by a cutting or crushing mill ; *that*, in the Staffordshire process, was bruised by falling between two steel rollers, so set that each grain was flattened and cracked, so as somewhat to resemble the famed Embden groats. If malt be rendered very fine and dusty, the wort is liberated with some difficulty : each grain, however, must be cut or crushed, otherwise it will not be acted upon by the water.

2. The QUANTITY OF THE MALT we calculate at one bushel and a half ; that of the hops at one pound and three quarters. The ale will be strong, and therefore is intended to be kept six months before it is tapped ; hence it should be well flavoured with hops, and no more of that article will be required for the beer, as we shall show, the one pound and three quarters sufficing for both ale and beer. If it be objected that we place our standard too high, and state quantities which will prepare an ale of intoxicating strength, we answer that we profess to brew a perfect liquor, one that will work well, fine itself to wine-brightness, keep any reasonable time in a good cellar, and never turn off hard. If ale be brewed of a strength short of that which secures these important points, a loss of full one-third may be calculated on in an average of three years ; whereas a good ale is safe, always valuable, *and may be reduced to any desired standard of strength* by adding table-beer to it at the time it is drunk. He who possesses no self-control ought not to brew. It is very bad economy to prepare a weak liquor that will become sour, acrid, and insalubrious in two or three months ; we have seen barrel after barrel thrown away by those who have brewed parsimoniously. Moreover, we shall add a receipt to make table beer by itself, and therefore any one may adapt his quantities to his particular views.

3. MASHING.—The word implies the extraction of all the soluble parts of the malt by hot water. It is usually performed in a deep and wide tub, with a hole at one side, an inch or two above the bottom, into which a large cock is fitted. The internal orifice is guarded either by a wad of straw, twigs, or a mash basket, to prevent the passing of the grains ; but all these are very inadequate substitutes for the false bottom which is now used. This is made of wood pierced full of small holes, and is dropped into the tub, from the bottom of which it is distant about an inch and a half, being supported by a hoop,

or by small cross-pieces of wood. This loose bottom should be kept firmly in its place by a second hoop nailed above it. It serves to filtrate the wort, which passes thus strained through a plug-hole or tap placed between the two bottoms. A still greater improvement comprises the false bottom, and to *that* a wooden pipe is adapted, down which the hot water is poured, and thus rises upwards through the malt. If the plain mash-tub, or that with a simple false bottom, be used, the ground malt must be kept ready by its side, and the copper (which, for our quantities, should contain eighteen gallons) ought to be filled with water and brought to a boil. *Any sweet water* will do; but the experience of many years proves that the soft fluid of a pond, with a rill running through it, is the best. Pour about six gallons of the boiling water into the tub, then add malt, while an assistant stirs constantly, till the whole be a thick mass; then add a pail of boiling water, then more malt, and so on, alternately, till only one peck of dry malt remain. The water used ought to be about thirteen gallons. Upon this mash sprinkle the remaining quantity of dry malt all over its surface, then cover the tub with a flannel cloth, or sacks, and let it stand two hours. If the false bottom, with the improved spout, be employed, let the malt (except the reserved peck) be put dry into the vessel; then pour twelve or fourteen gallons of water at 175° down the spout, and suffer it to rise gradually into the body of the malt; stir the upper part till it become completely wet, and lay on the dry malt, and cover with a cloth as before directed. While this process proceeds, fill, and bring the copper to a boil again, and about a quarter of an hour before the lapse of the two hours, draw off a little of the wort into a bowl; return this and repeat the drawing till no grains follow, and the wort be clear. Then draw the wort from the mash-tub, at first slowly, and afterwards in a bolder stream, as it is of consequence that it should be clear.

Malt absorbs and retains about three gallons of water to every bushel, therefore the wort obtained will be from seven to nine gallons. When the whole is nearly drained off, close the tap, and pour on so much boiling water as will make up eighteen gallons with the wort already obtained. Let this second mash remain an hour, and partially fill and again heat the copper, unless nine gallons remain in it. It will be always advantageous to have two furnaces, one for the wort and the other for water; where there are two, the first wort ought to be put into it with a due proportion of the hops, and brought to a boil, as by this means much time will be saved.

The hops should be rubbed up between the hands, and placed in a small cooler, where it will be advisable to digest them, during the period of the first mash, in as much boiling water as will cover them; by so doing, the quantity of water they absorb will be spared to the sweet-wort, and no loss of heat will be occasioned. Most persons, however, do not mash the hops.

4. MASHING FOR TABLE BEER.—If there be two coppers, the boiling will proceed while the grains undergo the third mashing, which will consist of nine gallons of water, at about 160 degrees,

added after the second wort of the ale has been drawn off; this mash may stand for one hour, when it will yield rather more than the water put on, and the grains will now be found exhausted. To give a little colour and strength to the beer, one pound of good treacle may be put to the wort, and it may then remain in its cooler till the boiling of the ale be concluded. Where there are two coppers, the beer may be finished off nearly as soon as the ale.

5. **BOILING.**—If there be a surplus boiler, the first strong wort should be put into it, with half the hops, mashed or unmashed, and two or three ounces of common salt, and bring the wort slowly to the boiling point, so that, if possible, the second wort—which in quantity ought to equal that of the water put in the tub—may be drawn off, and be in the copper with the first, in order that the whole may boil together. Great caution will be required to keep down the head of hops, which, with the froth, rises suddenly if the fire be brisk. A person should stand by the copper, with a mash-oar or a broad stick, to break down the rising head, and let the hot liquor throw its first waves over it, for waves they are. The head will then be carried under, and be put into brisk action; thus a loss may be prevented, and the hops will be dispersed throughout every part of the boiling fluid. *Rapid and brisk* boiling is beneficial, and this ought to be continued for one hour at the least; within that time a substance termed vegetable *albumen*, which was mixed with the wort and rendered it turbid, will be coagulated by heat, and partly, perhaps, by an astringent principle in the hops, and float in small masses throughout the thin clear wort. A bowlful of the liquor, taken up now and then, will exhibit this “*breaking*;” and the boiling should be continued for half-an-hour after it has been effected. It may be right to mention, that some writers recommend that the wort be boiled one hour previous to the addition of any hops, and half-an-hour longer with them; this, say they, tends to secure the full effect of the boiling process, but does not permit the loss of so great a portion of the fine aroma of the hops. We have not seen the plan in practice, but mean to try it immediately.

The *beer* may boil one hour with one half of the hops of the ale, which may readily be obtained by straining off some of the boiling wort through a sieve placed over the copper. This implies that there are two boilers, and that it is an object to save time; if there be but one, the beer must be kept aside till the ale be removed. *The hops of the ale* are amply sufficient for the beer; if half be added, as above recommended, the beer may be boiled for an hour with that quantity, and strained through the other half, by which means it will carry through all the strong wort that the hops retained.

6. **STRAINING.**—This is best effected through hair sieves, though wicker ones will do very well. Pass the ale wort into coolers, so that each may not contain more than one-third of the ale wort, for now the great heat should be thrown off as quickly as possible. Let the coolers be placed in the air, or where a current may pass over them if the weather be rainy. If the processes of mashing and boiling have been carefully conducted, there will be about eighteen gallons of raw wort, which, by rapid boiling, straining, and wort

retained in the hops, will be reduced to little more than fourteen gallons. The *beer*, by boiling, will be brought to eight gallons, but then it will lose nothing in the sieve, as it will carry down all the absorbed ale wort, and the hops may be pressed forcibly, which they should not be, in the first instance, after the ale.

7. FERMENTATION.—The commencement of this all-important process is commonly, and we think ignorantly, termed *pitching*.

We have said that the temperature most propitious to the work is in October, or when it may be about fifty to fifty-five degrees. The first cooler of wort ought to be ready six or seven o'clock P.M., cooled to eighty degrees. It is an error to suppose that a good quantity of *really fine* yeast or balm injures beer; the least hint of it, *if foul*, will spoil many gallons, but one pint of the thickest balm that can be obtained will be of service to the quantity now under notice. Let then one pint be thoroughly mixed and beaten up with two gallons of wort at eighty degrees; carry this to the cellar, and then place the coolers, side by side, near the vessel containing the working wort. This we recommend to be an eighteen-gallon upright cask, without its head; it is narrow at bottom, and thus allows the wort to be deep in it and retain its heat; cover the cask with a piece of flannel, and place its loose head upon that. Thus there will be a cask with two gallons of wort and one pint of balm in it, one cooler with three gallons, and two others with nearly five gallons of wort in each. If the cellar be well constructed, it will maintain a pretty equable temperature and be at about fifty-five degrees. By ten at night the working in the tub will be fully established, and then, three gallons of wort at seventy should be poured into it and stirred; cover it again, and leave it for the night. Early on the following morning add the contents of one cooler, after having tried the working wort with the thermometer. If the heat range between seventy and seventy-five degrees, put in five gallons, at about sixty-eight degrees, heating a quart or more of the raw wort, and pouring it into the cooler till the liquor in it be raised to the required degree.

Stir the working liquor, and leave it for six hours; then try the working heat again, and if it be above or at seventy-five, add three gallons at sixty-five degrees; again cover it, and in four hours add the remaining cool wort, reserving about two quarts for a peculiar purpose.

We have thus detailed the gradual additions of wort, at given heats, as we noticed them on a large scale; and we may add that we have practised the method we recommend with most gratifying success. It varies from, and is counter to, the ordinary mode of setting an entire batch to work at once; a process which in small gyles frequently fails: ours always succeeds, simply because the yeast has power over each addition, and brings it speedily to a fermenting state. It is not unlikely that, after the last addition, the working heat will be found at seventy-seven or seventy-eight degrees; in that case, we advise the immediate tunning of the ale. We presume that the two six-gallon casks be quite clean, sweet, and dry. Place them on their stands, and put into each one half of the reserved wort, mixed with two table-spoonfuls of flour, and one of

salt; take off some of the frothy yeast, and pour the liquor into the barrels till the froth begins to flow over; then desist for a time, and when the froth has somewhat subsided, add more liquor: thus, by degrees, the barrels may be filled to the bung-holes, and being placed a little on one side the yeast will flow down and may be caught by vessels placed under the stands. In three or four days the working will subside, the yeast becomes thick, and ceases to flow over; then a little of the ale, reserved in a stone bottle or jug, may be poured into the barrels, and in a few days the bung-holes may be covered with brown paper, well coated with thick yeast. The fermentation will now proceed slowly, and in the course of a fortnight each barrel may be safely bunged down, and the bungs secured with a mass of moistened binding sand.

We have known ale of the above strength to be clear in three months, perfectly bright in six months, and so rich and mellow, as to admit of no comparison with any ordinary beer whether purchased or brewed at home.

The table beer may be set to work precisely as the ale; but instead of dividing the remaining wort in coolers, the whole may be heated to seventy degrees as soon as the fermentation in the small parcel shall be strong. A barrel being then ready, a handful of flour, mixed with a quart of wort, may be put into it; upon that the working wort is to be poured, and then the bulk of the wort, at seventy degrees, till the barrel be full. Fermentation, and an overflow of yeast will soon take place, and these will subside in three or four days; and then, the bung-hole being closed, the beer will frequently be fit for the table in ten days or a fortnight.

A good table beer can be prepared by an independent process closely resembling that for the ale, by using malt and hops in the proportions of one bushel and a quarter of the former, to three quarters of a pound of the latter.

Mash as directed for ale, and work the worts by gradual additions, never lower than seventy degrees. Keep the working tun covered, and on the evening of the third day skim off the head of yeast, mix a tea-cupful of flour and a table-spoonful of salt with a bowl of the beer, divide it among the barrels; tun the remainder upon it, and finish the process in the manner above described. Such beer will be mellow in a month.

THE GARDEN GUIDE FOR NOVEMBER.

THE FLOWER GARDEN.

PLANT bulbs of all kinds, the large ones six inches deep, and small bulbs four inches deep. Take a little pains first to arrange them as to colours. Take up dahlia and Marvel of Peru roots as soon as frost has touched their foliage, dry them carefully, out of reach of heat, and store safe from frost. Begin at once whatever alterations and improvements are to be made, so as to have the whole season before you for completing. Air hardy plants in pits well, but be on your guard against sudden frosts, which are sometimes very severe for a few nights in succession.

KITCHEN GARDEN.

There is little to do this month, beyond ridging up vacant plots, and hoeing between the plants. All decayed leaves should be removed, or they soon become covered with moulds, and do much mischief. A good hunt for vermin should be made under old wood at the bottoms of palings and hedges. Paths should be turned, and protective materials got ready, and kept under cover for use whenever wanted. Peas and beans for the first crop next season, may be sown on well-drained ground, but where snails abound, they are likely to be entirely eaten up before the new year; still, as seeds cost but little, those inclined to speculate may try them, in the hope of getting a dish a week or ten days earlier than from the first spring sowing.

FRUIT GARDEN.

November is a busy month among fruit trees. Pruning should be commenced at once. Old apple trees infested with vermin should be well scrubbed with a hard brush dipped in warm brine, and all the holes stopped up with a paste made of clay, sulphur, soot, and cow-dung, the whole process to be repeated at the end of February, when any clay stoppings loosened by frost may be repaired. Plant at once all bush and tree fruits—delays are dangerous, and if got in while the ground is warm, they make root speedily, and get established by spring. Stake all newly-planted trees, or the winter storms may loosen them from their positions. Put in cuttings of gooseberry and currant trees. Prune vines and wall-fruit trees.

GREENHOUSE AND STOVE.

In stocking the house, give as much room as possible to everything; keep the house as cool as possible so as to be safe from frost. Plants to be forced for early bloom should be got into the greenhouse first, and remain there a fortnight before going to the stove. Roses, Siberian lilacs, deutzias, camellias, azaleas, double-flowering peaches, etc., are very useful for winter and early spring decoration, and should be brought on in batches to keep up a succession, but, if hurried into bloom, will, perhaps, be ruined, certainly injured in constitution. Keep vines well syringed where they have broken well, and let the heat be steady and moderate.

TO CORRESPONDENTS.

CAMELLIAS.—*Subscriber.*—Camellias will even show colour and stand still at this time of the year. If they are out of doors, take care that the frost does not nip them. Give very little water to the roots, but syringe the foliage occasionally.

GRAPES SHRIVELLED.—*B. W., Eltham.*—It is very probable that while you were away your house was shut up, and the vine denied fresh air and moisture; or it may be that the roots have got into a cold, wet soil, but you must be the best judge of that.

FUNGI IN FERN CASE.—*Alpha.*—There is probably some half-rotten wood in the soil, which, if you can get at easily, might be removed, but we should not advise you to disturb the roots of the ferns at this season. It would be preferable to remove the fungi daily, as they appear. The supply will soon be exhausted, and you will be rid of the plague.

COMPOSTS.—*Novice.*—It is not usual in preparing composts to measure the different ingredients with minute accuracy. An inexperienced hand can do no harm by using a measure, but it is unnecessary, as if there is a spoonful more of one ingredient the plant will never find it out. The measures given, therefore, are general guides, except in very particular cases, when it is the duty of the writer to warn the grower to measure out the ingredients exactly.

GREENHOUSE HEATING.—*C. D., Ealing.*—The best method for your house is by using a twenty-four-inch saddle boiler, and connecting four-inch iron pipes with it to circulate quite round the house; and as there is plenty of room to sink the furnace, we advise it being sunk sufficiently to allow the pipes being inserted in

a groove, and covered with an iron grating even with the floor of the house. Connect two pipes with the flow from the boiler, by means of a syphon bend, carried past the door into the garden, along the front, round by the door leading from the drawing-room, and then along the back into the boiler by means of a syphon bend connected with the return pipe.

RHODODENDRONS.—*C. Nash.*—Small plants of Rhododendrons to be planted in masses, should have about a six-inch space between the circumference of their leaves. This space they will cover in the next year's growth; and the sun will thus be screened from their roots, and they will flourish.

GUN-BARREL BUDDING.—*Job.*—In this method of budding, the incision is made on the stem instead of on the branch of the stock; and the stem, being stouter, will take a larger shield, and hence, buds for this sort of work must be cut from plump shoots. The incision should be made in the form of T. This is no cross cut below.

LARGE GERANIUMS.—*J. B. Parsons.*—We should advise you to pot your large geranium in as small a pot as its roots will go into, and keep it indoors at a window. If you have not window space, it might be saved by putting a piece of canvas round the roots, removing all the leaves, and then slinging it up in some dry place. Or it might be kept in a pot out of doors all the winter in a sheltered place, except during heavy rains and frost, and at such times it would not perish if put in a cellar for a week or so at a time.

LOBELIA FULGENS.—*Captain C.*—If your plants are in the open ground, take them up and pot them in good compost, with plenty of drainage. Keep them in a pit or greenhouse all the winter. They must never go quite dry, as they are marsh-growing plants. In spring, when they begin to grow, divide them, and pot afresh in very rich compost, and encourage growth with extra warmth and moisture, and either shift as they require it, or turn them out in rich soil in June.

CLIMBING ROSES.—*S. Parker.*—All climbing roses should be cut down close in February, so as to obtain a new and strong growth from the stove every year, for the first three years after planting. They will throw up stronger and plumper shoots every time. After the third year the growth need only be regulated by cutting out their weak spray, and occasionally removing an entire rod to make room for a new one. Lay on plenty of manure at pruning time, and fork a little in about the roots.

ROCHEA FALCATA.—*J. W., Brentwood.*—*Rochea falcata* requires a warm greenhouse. Soil, broken bricks, sandy peat, and dung, equal parts; plenty of water, and the full sun, all the summer, and not a drop of water all the winter.

MANURE FOR OLD GARDEN.—*K. Z.*—Lime is an excellent reviver for old garden soils. It kills vermin destroys sour humus, and supplies the salts that are most deficient, and will do something to eradicate clubs. Fifty bushels per acre may be used on an old garden loam of the ordinary staple; or, if clay, not less than seventy bushels per acre. It cannot be used too fresh from the kiln, and should be dug in rough the first time without breaking, and but a small quantity should be spread at a time, as it quickly slackens, and then loses much of its power in exerting an influence on the soil. After the ground has been laid up some weeks, it should be occasionally turned, and in spring, before planting commences, have another dressing of twenty-five bushels of salt per acre. At the second digging, the lumps of lime will be found to be soft and friable, and will mix then with the soil more freely than at first.

OLD GERANIUMS.—*C. Webb.*—Take them up. If you cannot pot them, plant them in boxes, using poor gritty soil or sand, and place them anywhere in the light and safe from frost, and give only as much water as will keep them alive. They may be planted in a frame, provided there is a dry bottom. If the position is damp, you may lose them all.

FERN COLLECTING.—*J. Turner.*—"The Fern Garden," by Mr. Shirley Hibberd, will suit you. It sells at 3s. 6d., and any bookseller will procure it for you.

OBJECTIONABLE VIEW.—*C. B. L.*—We should advise you to block out the view by planting under the trees, privet, *Taxus canadensis*, red logwood, and common green holly. In front, if there is anything like an open space, plant aucubas, variegated hollies, common juniper, and Chinese privet, which will bear *partial* shade well, but are not so well adapted for being completely shaded as those just mentioned.



DIOSCOREA DISCOLOR.

DIOSCOREA DISCOLOR.



THIS interesting herbaceous stove climbing perennial is a native of South America, and was introduced into this country about 1820. It has handsome leaves, variously coloured with several shades of green, with a pale glaucous stripe on each side of the midrib; the under-side of a purplish crimson. The plant is tuberous rooted, bearing inconspicuous green flowers. In summer the foliage is very handsome, and it is well worthy of cultivation wherever there is a stove.

The plant delights in plenty of room, and a light rich sandy compost of fibry loam, sandy peat, and leaf-mould, with plenty of river or silver sand mixed throughout the whole. It displays its many-hued foliage to great advantage, if trained round a balloon-shaped trellis. It should be repotted just as the tubers begin to send forth their young shoots in the spring, and if it placed on a tan-bed for a short time before being repotted, the shoots will then grow rapidly, and make a good display of fine foliage during the ensuing summer. It requires plenty of water during the growing season, but the quantity must be gradually reduced as the shoots decay in the autumn, and during the winter the soil should be kept moderately dry. It is easy of propagation by division of the tubers, at the time of potting in the spring.

THE CONSTRUCTION OF ICE-HOUSES.



THE use of ice for cooling liquors and freezing creams in the summer months, is much increasing in this and other countries. It is considered one of the greatest luxuries; and so necessary has it become in families of the first rank, that neither the confectioner nor butler can serve up their respective contributions to an entertainment without the assistance of ice. The difficulty of keeping ice through the summer, has given rise to various inventions for that purpose. The whole art consists in packing it closely together, and defending it from the action of the atmosphere.

Ice-houses for a middling establishment are, in general, about twelve feet wide, and sixteen feet deep; and in form, that of an egg, the narrowest end downwards.

The wall should be fourteen-inch work, and have an exterior coat of well-rammed clay all round, as well as over the top. At the bottom there is a well, two feet in diameter, to receive the drainage from the ice; and from the bottom of this, a brickwork drain, of small bore, is laid to a lower distance, to draw off the water from the well. This drain is soundly built with cement, and has a water trap in some parts of it, to prevent air ascending to the ice.

The north side of a hill near the house is the most eligible situation for such a building, because this is as much as possible out

of the sun's heat; and being sunk at a sufficient height above the base, allows of perfect drainage. An arched passage issues from under the crown of the arch of the house to the open air, both this and the house being covered with four or five feet of earth, and usually planted with evergreen shrubs. This passage has an outer door on hinges, and two inner doors, one about the middle of the passage, and the other close to the body of ice, when the house is full.

These latter are not on hinges, but composed of narrow parts which drop in a groove in the posts on each side. This construction is necessary to save the labour of removing all the straw in the passage every time the house is entered.

Ice-houses may be formed on the surface of the ground, when there is no convenient bank to sink into; and if they be sufficiently air-tight will preserve ice as well as if sunk in the ground. They may be built in the shape of a dome, either of stone or brickwork; a passage and door opens to the northward; the whole is then covered thickly with earth, and planted, or very thickly thatched, with straw or reeds.

Or, if a large cone of snow or pounded ice be got together in winter, and covered with a good coat of any kind of dry litter, and afterwards well thatched to prevent rain sinking into it, it will keep for eight or ten months.

FILLING THE ICE-HOUSE.—This is usually performed in one day, if possible; and the first favourable opportunity is seized, that is, when plenty of ice may be had for the purpose. It is broken on the pools, and drawn out with iron hooks or rakes, and carted to the ice-house. The latter is prepared to receive it by laying a foundation of straw over the grating of the well, and by setting a rank of *half trusses* of wheat straw round the wall, as the ice keeps much better, surrounded with a lining of straw, than if it lies close to the wall. There is, or should be to every ice-house, a paved platform walled round in front of the door; into this the ice is first thrown, and broken into small pieces by heavy clubs or beaters. As broken, it is thrown into the passage with shovels, and from thence into the house, where two men with rammers level and tread it together as firmly as possible. When as much is got in as to be nearly as high as the first rank of straw, another rank is put round, and then more ice, and so on, till the house is full, and there is no longer headroom for the men to work. The space over the ice is next filled compactly with trusses of straw, as well as the passage outwards to the outer door, which finishes the work. It is to be observed, that when an ice-house is to be filled, the quicker it is done the better. A good many hands are required, because the more it is pounded the firmer it congeals in the house, and the better it keeps. Some advise salt to be added to the body of ice to assist congelation; nothing can be more absurd, as it has a directly contrary effect.

Water is also advised to be used in packing the ice; but this also is unnecessary, except only when a house is filled with snow in a dry powdery state, a little water may be added to make it knead. Snow is a good substitute when ice cannot be had; for this after being housed soon becomes a body of ice. However well constructed the

house may be, there is always a gradual dissolution going on from the time the ice is put in, till it is entirely wasted; and therefore, when ice is wanted the door should be closed again as quickly as possible. Ice is used in domestic economy for several other purposes besides those above stated, for preserving rich soups, fish, and game; an ice-bin in a cellar is also a most useful appendage.

THE PERPETUAL FLOWER GARDEN.



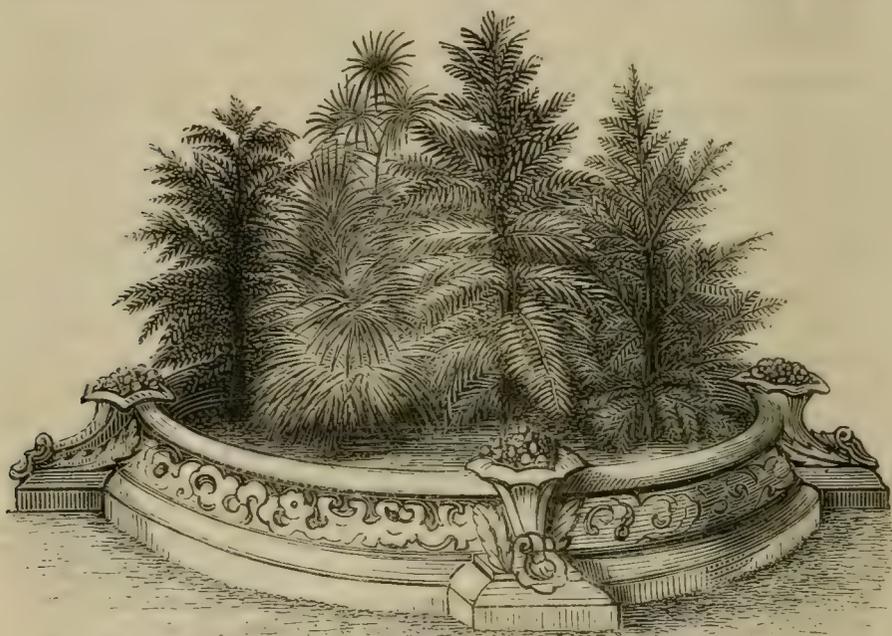
HERE has been enough said about the shortcomings of the prevailing system of embellishing gardens, and we may turn from the negative to the positive, in hope of some advantage to our readers. We propose, then, to unfold to them a plan for the perfect abolition of tameness and sameness, for making an end of monotony and wearisomeness, for the termination of the floral see-saw, the feast and fast system, by which we make sure of flowers during June, July, and August, and of a beggarly account of empty beds during the remaining months of the year. We are to propound the arcanum—the secret, the mystery—which is to be no mystery by the time we have done with it; and it is all to be made so plain and pleasant, that from this time forth garden grumblers are to cease from off the earth, disappointments are to be known no more, and the reign of concord and flowery bliss is to set in with such severity as to overcome all obstacles. You are now expecting something new, yet Solomon has averred that there is nothing new under the sun. So beware!

The arcanum to be expounded is the plunging system. It cannot be our invention, because plunging in some sort of way was done before we were born. But we claim to have discovered and developed the full possibilities of the system, and profess to know more about it than any practitioners of gardening in all the world. The object of the plunging system is to keep up a rich display of flowers or leaves on the same spot the whole year round, and this is accomplished by growing suitable plants in pots, and plunging them where required when they are at their very best.

The plunging system is nothing unless there are at least four changes in the year—say in April to put out hyacinths and tulips, and in May or June to put out geraniums, calceolarias, and mixtures; in October for chrysanthemums, and in December for evergreens. But there may be twelve, twenty-four, or even fifty-two changes, if it is the taste of the proprietor to encourage change, and he has the means of keeping the wheel turning at that rate. What one may do on a small scale another may do on a large scale; and wherever the plunging system is fairly tried, it will be found to surpass in splendour, certainty, and variety, every other system that can be thought of to compete with it.

Let us endeavour to give an idea of the system as actually practised. There is a centre circular bed enclosed in a beautiful jardi-

net of Ransome's imperishable stone, and there are three borders, all of them faced with a handsome moulded curb, also in Ransome's stone. Two of the borders are planted with trees and shrubs, the principal border of the three being as richly furnished as possible with Aucubas, Hollies, Yews, Berberis, Box, Japan Privet, and other first-class evergreens. During winter this plantation is still further enriched by plunging amongst the permanent shrubs pot-plants of Cupressus Lawsoniana, pyramid ivies, Irish yews, and other characteristic plants, all of which are removed in spring to better quarters to promote their growth for the season, as the scene of the plunging is very much overshadowed by large trees. The front lines of these borders, and the circular stone bed, consists of cocoanut-fibre refuse two to three feet deep. It is in these front



A WINTER GROUP ON THE PLUNGING SYSTEM.

lines that the plunging, *par excellence*, is carried out in the most complete manner, and a display of colour produced at all seasons of the year, the effect of which is greatly heightened by the depth of green and richness of variegated foliage of the background.

Two remarks are proper at this point. In the first place, well-grown pot-plants, plunged in cocoanut-fibre, have a much brighter, a much more artistic and finished appearance, than plants of the same kinds equally well-grown in the open ground. The beautiful, clear, reddish-brown colour of the fibre refuse, by contrast, brings out every tint of green with peculiar brightness, and affords relief to every kind of flower. There is a peculiar charm about a well-furnished plnngge bed if the material consists of cocoanut-fibre or

clean tan; it is owing to the colour of the material, which sets off and brightens every scrap of vegetation, to which it serves as a groundwork. An amateur who has a passion for floriculture, and is compelled to reside near a town, and must put up with a small garden, may have full gratification of his taste by following the plunging system, and may soon have better collections of plants than the majority of people possessing large gardens, and making pretensions to large practice. Moreover, the system is admirably adapted to produce splendid effects by means of the cheapest plants, and a very large proportion of the subjects grown ought to be hardy, and adapted to bear some amount of rough treatment.

Now let us suppose some one of our readers anxious to carry into effect these proposals; with him or her the question will probably be, "How am I to begin?" We will endeavour to answer the question in such a way as to suit a majority of cases. The first thing to be done is to select the site for the operations, and here a word of advice may be useful to this effect—feel your way carefully, begin with one border or so, and extend the system as you become accustomed to it, and equal to its demands, for it will swallow up many more plants than you have been accustomed to provide for the same space when planting out was followed.

If we had to advise in particular cases, we should frequently turf over many of the existing flower-beds, and reduce the area for display to very circumscribed limits; for in many small gardens the multiplicity of flower-beds is puerile, and makes one think of a doll's garden, or a farthing kaleidoscope. Of course we get into difficulties at this point; people are not prepared to give up their flower-beds, and do not quite see the way clearly to do anything with them but as they have been accustomed to do. If there are groups of beds, and the desire is to improve the garden and reduce the extent of bedding, and make a first start in plunging, it will probably not be difficult to mark off certain of the beds to be planted with evergreen and flowering shrubs, with some good hardy herbaceous plants in front of them, and reserve the remainder for experiments in plunging. Let us illustrate this suggestion by a rough-and-ready example. Suppose a group of beds, as in the

| | | | |
|---|---|----|---|
| 1 | 2 | 3 | |
| 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | |

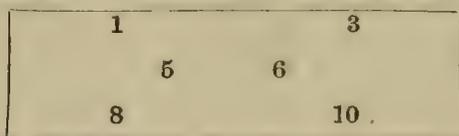
annexed diagram. We have here ten beds, and we desire to reduce their number without making them one-sided. We have but to strike out, say, 2, 4, 7, 9, and we have six remaining.

Or we may strike out 5 and 6, or 1, 2, 3, 8, 9, 10.

Now, suppose that we cannot attempt to manage six beds by plunging, as shown in the second diagram, why not plant 5 and 6 with groups of hollies, or, if equally convenient (as it may be in a peat district), with hardy rhododendrons and azaleas, or with paup'as

grasses and tritomas, and a few other such striking and graceful plants, reserving the four outside beds for the flowers. This diagram does not illustrate anybody's garden, but is intended to explain how easily the way to reform may be found by those who have reforming tendencies.

Plunging in common earth, that is to say, in the soil of the place,



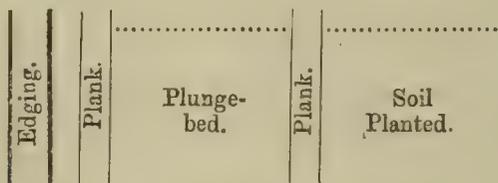
is possible, but not desirable. So we may use sawdust, or old tan, or even moss, or coal ashes. But there is nothing half so good as the cocoa-nut fibre refuse; it is always clean and moist, never wet, never dry, pleasing to look at (as before remarked upon), harbours no vermin, and a lady careful of her hands may work at plunging pots in it, and scarcely find one stain upon her fingers when the work is done. The next best thing is tan; the next best, moss. Plunging in mould is allowable, but not advisable; but coal ashes are simply filthy, and to adopt them in the "plunging system," that is, as an element in a decorative system, is heresy. With cocoa-nut and tan there is no need at all to make provision for the drainage of the pots, but in plunging in common mould or coal ashes, it is necessary to place a brick, or an empty inverted pot, under every pot containing a plant, to prevent the plant becoming water-logged, and also to keep out worms.

The question now is about the formation of the plunge-beds. In places where stone or wooden edgings are already in use, there is not much difficulty. You decide what is to be the width of the plunge border, and to that width the earth is to be dug out. If the border is narrow (say three feet), a depth of eighteen inches will be enough, because very large pots will not be used. But if wide (say six feet), it may be cut to a sloping bottom twelve inches deep at the extreme front to three feet deep at the extreme rear, which will allow of the largest pots or tubs with specimen conifers for the back row in winter time. In some places good plunging will be done with small pots, and in other places good plunging will be done with large pots; and again some practitioners will indulge largely in winter trees, and some will only care for summer flowers, etc., etc.

Where beds are cut in grass, it is an easy matter to take out the earth and put in suitable plunging material; where there is a grass verge to a border, there can be no difficulty in cutting sharp to it; but in case of a box or thrift edging, the cutting must be done with care, or the edging may be killed. Put down the line three inches from the live edging, and cut down sloping, so as to spare the roots. If flooring boards, or any rough planking, can be afforded, line the bed with timber, back and front, as shown in the diagram, where we suppose the front to be clipped box, or in any case a bold and substantial stone edging; next within that, as a lining, a plank on

edge; then a given breadth of cocoa-nut fibre refuse for plunging; next a plank on edge as before; and then, beyond that, the undisturbed soil of the garden, with a background of evergreens, etc., etc.

When all this is done, there must be established a regular system of cultivation to keep the beds supplied. If this cannot be accomplished, better no plunging at all. However, one or two borders may be tried at first, and the system of growing will be found to be more simple than appears; and, in fact, its chief charac-



teristic is that *it is a system*; every separate batch of plants must be prepared to come on in its proper time, with no excessive glut to bewilder the cultivator, and never a deficiency of good things to make a cheerful display on any day in the whole round of the year.

The principal subjects for plunging are, for early spring, aconites, snowdrops, crocuses, hyacinths, and tulips; for late spring, wallflowers, yellow alyssum, white iberis, rosy aubrietia, sparkling dielytra, bold and handsome crown imperials. For early summer, stocks, roses (brought on in pits or by slow forcing), yellow cytissus, deutzias flowered in cold pits, rhododendrons, and a few of the more showy annuals grown in frames. For succession, geraniums, calceolarias, and all the rest of the summer flowers. For September, *Sedum fabarium*; for October, British ferns, then all fresh and bright, with any odds and ends of colour to light them up. For November, pyramid and bush chrysanthemums; for December, ivies, conifers, and berry-bearing shrubs, and so on to the spring bulbs again. In selecting subjects, and in the cultivation of the plants, it must be always remembered that spreading concave-headed plants are of less value than comparatively narrow, and in the case of zonal geraniums, "long-legged" plants, because of the rather close packing required to produce a rich effect. Thus, the pyramid chrysanthemum is far to be preferred to the dwarf, close-trained, convex plant that would suit the parlour window. The tall, spare habit and fresh appearance of well-grown seedling geraniums render them invaluable for plunging.

WATER SCENERY.

(Continued from page 329.)

HEREVER a natural stream flows through the grounds with something of a pace, a pond or lake may be obtained by the simple process of making a suitable excavation, and checking the flow of the water by a dam formed of stone or brick. First divert the stream if the pond is to occupy a position in its natural course, if not, let the stream flow in its wonted channel until the new channel is ready for it. Then make the excavation, and have it well puddled if the ground is of a nature to require it; generally speaking, puddling is unnecessary, for though the water may filter away for some time,



RUSTIC BOAT-HOUSE.

the deposits of one season will usually suffice to render the bottom comparatively impervious, and the water will then keep to its proper level. One of the finest pieces of ornamental water in the country, the great lake at Sherborne Castle, affords a good example of this simple method of treatment, for it is nothing more than a natural stream dammed back; the work of one of the greatest landscapists this country has ever produced.

To obtain picturesque effects in connection with water scenes, is one of the easiest things in all the range of garden embellishment. The water is always our friend; its gleaming silvery surface when the sun shines, and its deep indigo, or sea-green colour under a dull sky, and with a breeze troubling its surface, render it so pleasingly contrastive to all possible surrounding objects, that we may almost declare it difficult to spoil a water scene. But of course there are limits to our choice of accessories, there is a good and a bad taste in

these matters, as in all else, and appropriateness must be studied. Here are two suggestive sketches of the most simple nature. One is a copy of Cotton's Fishing-box near Hartington-on-the-Dove, which



RUSTIC FISHING-HOUSE.

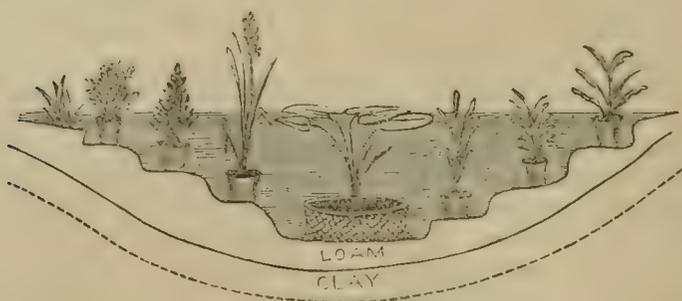
we adopted in the embellishment of an island on a good fishing stream in the grounds of an employer; the other is a boathouse, which has no merit of design, but is placed in just the right spot to render it appropriate and picturesque.

According to our rule of considering small things equally with great, we will now describe a well-kept suburban garden of small extent, the hobby of a respected friend; the length is little more than one hundred and fifty feet, the breadth forty. From the drawing-room and study windows we look down on the out-houses auxiliary to the kitchen. These are covered with ivy and clematis of many years' growth, and boil over at all corners with huge tangled masses of glossy foliage and interlaced branches. On the right hand, starting from beneath the roof of clematis, runs a close mass of evergreens, which forms a border winding by a bold curve to a series of flower-borders and parterres. On the left, the garden-wall is covered with old jasmines, almonds, pyrus, clematis, montana, ivy, and creeper-vine. The border under this wall consists of a few small evergreens, many of them rhododendrons, and before these stands a

row of dwarf roses, with shrubby perennials between them. In the centre runs an oblong parterre, studded with bright flowering perennials in large groups of contrasting colours. The path runs on each side of this centre-bed, bounded on the right by the border of evergreens, on the left by the roses and perennials. Where the paths meet at the further end of the central bed stands the fountain, the path encircling it, and then passing on down both sides of the garden, where the shrubs thicken and at last terminate in trees, with woody country scenery beyond the garden as a background. We describe details not because they are uncommon, but because the fountain is the key-note to the whole, when placed and arranged as this is, and the result is a complete picture.

The stone basin is about ten feet in diameter; around it is a ring of rockwork, or, to speak more correctly, dark stones, studded with the choicest collection of British plants ever got together in so small a space; a mass of dark green juniper forming a rich clump of overhanging verdure, that serves to break the formality of the circle, and adds, by contrast, to the beauty of the brighter foliage, and gay mingling of colours in the succulent and trailing plants with which the remainder of the ring is thickly studded. A light wire fence surrounds this beautiful garland, and beyond this is a broad circle of the greenest sward, adorned with a fine group of standard roses, each of a distinct and bold tint, the heads of all being trained out fountain-fashion. In the centre a bold jet plays: it is supplied by a cistern, elevated and hidden by trees. This scene from the windows of the house has a charming aspect, and every one of the many fine clusters of colour in the surrounding borders derives additional glory from the vivid green of the zone of turf, and the sparkling freshness of the water, with its groups of lilies, cape pond-weed, and trumpet-lily, and its stock of lively gold-fishes.

A garden of the smallest dimensions affords facilities for the introduction of water scenery of this kind. A basin of artificial stone is to be preferred where the dimensions are small, and the



formal arrangements of the flower-beds such as to render a rustic pond out of keeping with the scene. Such a tank must not be enclosed by shrubs or a profusion of vegetation, but must offer its white rim in contrast with a smooth turf, sloping gently up towards a hillock, out of which the basin rises with its circle unbroken,

or only broken in one or two places by an elegant trailing plant or piece of appropriate statuary. In such cases the surrounding borders should be formally laid out with gay flowers, the box, or still better, stone edgings kept in the neatest trim, the standard roses on the turf few but fine, and anything in the nature of a shrubbery or sylvan retreat, placed sufficiently far away as not to break the formality and brightness which should surround the basin. The fountain may be of a classical design, a mere jet on the surface of the water not having sufficient dignity, while the ornaments of the walks and grass-plots should be elegant vases crowded with gay plants, and light iron chairs, rather than rustic baskets and mossy seats.

In the formation of a small pond for the cultivation of aquatic plants, the following process may be adopted with advantage:—A concave hollow must be dug of the necessary dimensions, sloping steadily from the outer rim to a depth of not less than four feet in



DESIGN FOR RUSTIC FOUNTAIN.

the middle. Over the bottom must be placed a layer of puddled clay, of the thickness of from six to twelve inches; above the clay a layer of rich sandy loam, or well-tempered soil from the bottom of a pond, must be arranged in circular terraces, like the seats in an amphitheatre, so as to form a series of shelves of various depths, from the margin to near the centre. On these shelves may be planted the aquatics which are intended to be grown in the water. The advantage of a descent by a series of steps, instead of a regular slope, is that you may place pots with plants at various depths, so as to submerge each sufficiently, which you could not do on a slope; the pots being of course removable at any time, for renewal of

plants, or during severe weather. This form of bottom also affords the best possible facilities for repairing or altering the arrangements of the plants; they are readily accessible, and exotic aquatics, grown in pots, may be immersed during summer at the several depths which they require, and removed back to the house during the severity of winter.

As no one would desire to fill a pond with pot plants, the bed of loam overlying the puddling affords abundant root-room for strong-growing plants. In the cut is shown a water-lily in a basket; this being the readiest mode of introducing this queen of the waters, for it is fixed in the first instance where required, and in time the



DESIGN FOR CLASSIC FOUNTAIN.

basket crumbles away, and the roots spread, and the plant obtains a fixity of tenure.

Stone is unquestionably *the* material for fountains, but its cost precludes any extensive use of it, and the best substitutes claim a moment's consideration. There are several kinds of artificial stone in use for garden embellishments; and these being well adapted to the purpose have done very much towards the revival of classic taste in gardening, by placing within the reach of many who could not aspire to the luxurious marble and porphyry of the old princely fountains, a material in every way suitable by its durability and cheapness, even when wrought to forms of high art, and its perfect

resemblance to stone. The best designs have been sought and well worked out, for fountains, statues, vases, and groups of objects of various kinds, and these form valuable accessories to an ornamental garden. Iron is not only more capable of assuming graceful outlines when fused into well-designed moulds, but it bears exposure to the weather for any number of years without deterioration, if painted once in two or three years; it is not liable to chip, as most real, and some few artificial stones are, and generally the cost is lower than artificial stone of any kind. Nevertheless, iron is not stone, and must ever depend for its capability of imitation on paint, which precludes the possibility of weather stains, and that mellowing of colour which stone acquires by long exposure to the atmosphere.

The annexed design for a fountain, consisting of a group of Tritons supported by dolphins, in a basin of the old French school, might very well be worked out in artificial stone. It should be produced on a somewhat large scale, to tell with effect in the scene, and is, of course, only adapted to the terrace of an Italian garden, or to form a centre to a series of brightly-coloured parterres or grass-plots, broken by flowers. In a rustic scene it would be inappropriate. The artist has carried the outer jets too high; if they had but half the height given them in the engraving, the summits of the several jets would form a pyramid, and give much more grace to the *coup d'œil* than it has at present.

PRIMULA SINENSIS.



FROM the popularity of this flower, it is needless my attempting a word in its praise, but I must be excused expressing my admiration of beauties I have not seen noticed by any professional writer. It is the extreme delicacy and softness of colouring peculiar to the flower, the tints varying, with but few exceptions, in each individual plant, as produced from seed, also the forms of the blossoms are worthy of particular attention, differing as these do, equally with the various tints, keep up a lively interest at the first opening of every new flower. It is to those who, like myself, feel pleasure in the cultivation of the *Primula sinensis*, and who are not in the possession of a superior mode of growing their favourite plant, that I venture to offer my mite of information; and, if considered by you worthy a place in your valuable magazine, venture to suppose that it may prove acceptable to a portion of your readers. The compost is an important object, but there are also other matters connected with it to which proper attention must be paid, and it is by their combination that superior cultivation is obtained. Fibrous loam of a sandy quality (if of a retentive nature, add sufficient silver sand to reduce it to a proper state), and peat, equal parts of each, and one-fifth part of well-decomposed cow manure; to the above add a little pounded charcoal.

Drainage.—I make a point of allowing a good drainage, composed of small brick rubbish from the kiln, about the size of a hazel nut, or thereabouts. To pots called by the potters forty-eights, measuring from five inches to five and a quarter across the top (for there is a variation in the size at different potteries), I put one inch in depth of the above drainage, and to the next size larger, called thirty-twos, I increase half-an-inch, and decrease in proportion when smaller pots are used for young plants. In the absence of small brick rubbish, old garden-pots broken up small may be used, but I give the preference at all times to the former, if it can be procured without inconvenience.

Seed.—I generally sow the seeds in the month of April, in pans or boxes, placing them in a cold frame till up; as soon as in rough leaf they may be pricked out into small pots singly, and when they have filled the latter with roots, shift them into the next size, following the plan up till they reach a full sized plant in what are called twenty-fours; in this they will finish blooming, and furnish a most desirable plant for the conservatory, greenhouse, or drawing-room.

ON THE NECESSITY OF TRENCHING, OR DEEP CULTIVATION.



AS drainage is the first step towards the permanent improvement of the soil, the trenching or deepening of it may be considered the second, and, in fact, an operation of indispensable utility to its fertility. By deepening and loosening the soil, we enable the superfluous water to pass more freely into the drains, and thereby render them more efficient in performing the important duties for which they had been intended. By loosening the soil we render it more porous, and thereby enable it, by capillary attraction, to retain a quantity of moisture within its pores sufficient for vegetation in the driest season of the year, and at the time to carry off most efficiently the superfluous water in a wet, bad season. By deepening the soil we cause a happy mixture of the earths, we renew our exhausted surface-soil, and admit the free accession of the great natural agents—heat, light, air, and water. These are matters, with the beneficial effects of which every practical gardener has been intimately acquainted for the last four centuries; and upon this operation alone he depends to keep his garden in the highest state of fertility. The gardener is not afraid to bring up the subsoil and expose it to the winter's frost, for practical experience teaches him better—that on the deepening of the soil depends his successful cultivation more than on the enriching properties of manures. He is fully aware that ground deeply cultivated, without manure, will produce better crops than shallow ground, though assisted and enriched by the best and most stimulating. By deep cultivation the plants can penetrate to a greater depth, in search of food, into the soil; and dry weather has

no effect upon them, their roots being far removed from the parching influence of a burning sun. By deep cultivation, rain, instead of being injurious, has a most salutary effect upon the soil, by bringing it to the temperature of the surrounding atmosphere, and by communicating to it in its course into the drains the several gases it had absorbed in its passage through the air, the most important of which are carbonic acid and ammonia, the true food of plants. By means of deep cultivation we shall be enabled, after a little time, to turn down our exhausted surface-soil, and replace it by a subsoil, which will far excel it in point of fertility; and, finally, we shall cause that beautiful admixture of the principal earths on which the fertility and productive properties of all soils solely depend. The reader should not consider these as wild theories, but as the result of the writer's own practical experience and observation for the last twenty-five years; and he must say that these are only *some* of the very many important changes and advantages arising out of, and to be derived from deep cultivation.

We next come to the proper time to trench or deepen the land, which should be done as early in the autumn or winter as possible, that it may be well pulverized, by being exposed to the winter's frost, and laid open to the influence of the atmosphere upon the many injurious and poisonous ingredients contained in the subsoil—such as the salts of iron, copper, lead, etc., etc. To assist in the total neutralization of these poisonous salts, I would strongly recommend the application of quicklime at the time of trenching, as, by taking the place of the metallic oxides, it will form salts of lime, all of which have, without exception, the most beneficial effects upon the soil. Should the subsoil be treated in this way, there is no danger in bringing to the surface any portion even of the worst description; but of the properties of lime I shall speak more fully in its own place, when treating of manures.

Many plans may be laid down for the trenching of ground, but I consider the following as a very efficient and good one:—With a line mark off a bed three feet wide, on one side of the field to be trenched, for the first trench, by nicking along it with the spade. Pare from this bed all kinds of weeds and grass, and remove them on the surface of the field to be trenched; then take the line to the opposite side of the field, and lay off a similar bed, which should be treated exactly in the same manner as the first. Then return to the first bed and remove the earth two spadings deep, which should be carried in a wheelbarrow or hand-cart and laid upon the bed at the other side, in order to fill up the last trench, which shall remain unfilled at the closing of this operation. Now commence and mark off your next bed of three feet alongside this open trench; pare off the weeds, etc., into the bottom of it; then commence and dig your first spading, which should be thrown into the bottom of this trench; after which dig a second spading, and place it over the first, in the form of ridge or drill, that as much of the surface as possible may be exposed to the action of frost, air, etc.; and thus continue until the whole is completed. Should you have plenty of manure, this will be the best time to dig it in, placing it between the two spits,

in order to prepare the ground for the following crop, which in every case should be a green one, being the only crop that succeeds well on a ground trenched the first year. If manure be scarce, it is better to reserve it until such time as you are preparing the ground for the immediate reception of the crop, at which time it should be placed at the bottom of the drill—as plants require food immediately at their roots, and not in contact with the stem. All ground intended for green crops should be prepared in the foregoing manner—that is, either previously trenched or deeply dug. It may be well to remark here, that ground not long since trenched, in its preparation for a green crop, may only be deeply dug, which operation is conducted exactly in the same manner as trenching, except that instead of turning up a second spading, we merely shovel the loose earth after the first in the form of a drill over the first spit, and then dig over the bottom of the trench, so as to leave the subsoil loose, for reasons already stated.

By attending to the suggestions here given, the greater and decidedly the most laborious portion of work will have been executed before the approach of spring, and at a season of the year when there is generally spare time. I think I may conclude this article by laying down the following maxim: that as soon as one crop has been removed, you should immediately set to work and prepare the ground for the reception of that which is to follow, by no means allowing the land to lie idle, producing weeds to reproduce themselves.

SKELETON LEAVES.



PLANTS as well as animals are organized bodies, and, like them, their parts may be dissected and decomposed by art, thereby unveiling to us their peculiarities of structure and habit, and enabling us more correctly to classify and arrange them.

Among the various helps towards acquiring a knowledge of the anatomy of plants, one of the principal is the art of reducing to skeletons, leaves, fruit, and roots; that is, of freeing them of their tender and pulpy substance in such a manner as to allow us to survey alone the internal harder vessels in their entire connection. This has been done by various ways of decomposition, and now we purpose to give the history of the art. The first person who conceived the idea of employing decomposition for the purpose of making leaf skeletons was a professor of anatomy at Naples named Severin, who, in a book which he published in 1645, gave the figure, with a description, of a leaf of the *Ficus opuntia* reduced to a skeleton. Of the particular process employed to prepare this leaf, the figure of which was very coarse and indistinct, he gives no account, saying only that the soft substance was so dissolved that the vessels or

nerves alone remained, and that he had been equally successful with a leaf of the palm-tree. The process he confided to Bartholice alone, under promise of secrecy, and the invention excited no attention. About seventy years after, the Dutch anatomist, Ruysch, was led from the dissection of animals to that of plants, and for this purpose tried a method which he had employed with success in the former case—namely, by covering the leaves and fruit with insects, which ate up the soft and pulpy parts, leaving those which were hard.

This method, however, was imperfect, never producing a complete skeleton; and he therefore endeavoured to execute the task with his own fingers, after he had separated the soft parts from the hard by decomposition. In this he succeeded so perfectly, that all who saw his skeletons of leaves or fruit were astonished at the fineness of the work, and wished to imitate them. At first Ruysch endeavoured to keep his process a secret, and evaded giving direct answers to the questions of the curious; but after several other persons had endeavoured by various means to produce the same effect, but unsuccessfully, he, in 1723, published the whole method of preparing his leaf skeletons; and it has been conjectured that he gained his information at first from an account of the experiments of the Italian anatomist first mentioned. When the method of producing these skeletons became publicly known, they were soon prepared by others, some of whom made observations contrary to those of Ruysch. Among these, Du Hamel, in 1727, described and illustrated with elegant engravings the interior construction of a pear; and ten years afterwards Seligman, an engraver, published figures of several leaf skeletons, which he had taken, not by drawing, but by impressions from the leaves themselves, taken with red ink. Seligman died before he had completed more than thirty of his plates. The process has of late years been brought to perfection; it is useful to the botanist, and pleasing to the unscientific observer. Much may be learned from it even by merely a cursory inspection; but the real study of botany has of late years become so general, that we hope that a description of the method used to procure these elegant preparations may induce some of our young readers to make a trial of it.

Choose the leaves of trees or plants which are somewhat substantial and tough, and have woody fibres, such as the leaves of orange, laurel, apricot, apple, oak, etc.; but avoid such leaves as have none of the woody fibres which are to be separated and preserved by this method; such are the leaves of the vine, lime-tree, and some others. These are to be put into an earthen or glass vessel, and a large quantity of rain-water to be poured over them; after this, they are to be left to the open air and to the heat of the sun, without covering the vessel. When the water evaporates so as to leave the leaves dry, more must be added in its place; the leaves will by this means putrefy, but they require a different time for this; some will be finished in a month, others will require two months, or longer, according to the toughness of their parenchyma.

When they have been in a state of putrefaction for some time, the two membranes will begin to separate, and the green part of the leaf to become fluid; then the operation of clearing is to be performed.

The leaf is to be put in a flat white earthen plate, and covered with clear water; and being gently squeezed with the finger, the membranes will begin to open, and the green substance will come out of the edges. The membranes must be carefully taken off with the finger, and great caution must be used in separating them near the middle rib. When once there is an opening towards this separation, the whole membrane always follows easily. When both membranes are taken off the skeleton is finished, and it is to be washed clean with water, and then dried between the leaves of a book.

Fruits are divested of their pulp and made into skeletons in a different manner. Take, for instance, a fine large pear, which is soft, and not tough; let it be neatly pared without squeezing it, and without injuring either the crown or the stalk; put it in a pot of rain-water, covered, set it over the fire, and let it boil gently till perfectly soft, then take it out and lay it in a dish filled with cold water; then holding it by the stalk with one hand, rub off as much of the pulp as you can with the finger and thumb, beginning at the stalk, and rubbing it regularly towards the crown.

The fibres are most tender towards the extremities, and therefore to be treated with great care there.

When the pulp has thus been cleared pretty well off, the point of a fine penknife may be of use to pick away the pulp sticking to the core. In order to see how the operation advances, the soiled water must be thrown away from time to time, and clean poured on in its place. When the pulp is in this manner perfectly separated, the clean skeleton is to be preserved in spirits of wine. This method may be pursued with the bark of trees, which afford interesting views of their constituent fibres.

These simple preparations not only form elegant ornaments, but they are extremely useful to the student in botany, more interesting and more readily comprehended than drawings of the anatomy of plants. Attempts have been made to inject coloured liquids into the delicate and minute vessels of vegetables, and we believe it has partially succeeded. The present season of the year is propitious for making leaf skeletons, and we recommend our young readers to follow our directions.

WINDOW GARDENING.

BY JOHN R. MOLLISON.

(Continued from page 336.)

FILMY FERNS IN CASES AND UNDER BELL-GLASSES.



IRST on our list is *H. fuciforme*, a native of the island of Juan Fernandez, of Robinson Crusoe celebrity. It has beautiful pale bluish-green fronds, and is considered the finest of the genus.

Of the Trichomanes, the only British species is *Trichomanes radicans*, which we noticed in a former paper. Both it and its variety, *T. Andrewsii*, are excellent ferns for the Warrington case. Among others we have *T. scandens*, a grand climbing fern, excellent for covering a piece of rockwork. It has large elegant yellowish-green fronds.

T. reniforme, a very distinct species of great beauty, with large kidney-shaped entire fronds.

T. venosum, an extremely beautiful fern for a case.

But the loveliest of all ferns, the beauties of which surpass the power of pen or pencil to portray, is the *Todea superba*. Nothing can surpass the extreme beauty and sumptuous appearance of this fern. No fern-grower should be without it. I consider it as the highest point of honour in fern cultivation to have the credit of possessing a well-grown plant of this queen of ferns in a case. Next to it stands *Todea hymenophylloides*, commonly known as *Todea pellucida*, a New Zealand filmy fern of great beauty, and nearly hardy enough to stand outside during a very mild winter. It is a recognized favourite with all fern-growers, and very distinct from any other kind of fern.

Todea barbarea is also a very desirable fern, free-growing and of easy culture.

Todeas are not creeping ferns like the *Hymenophyllum* and *Trichomanes*; they are really tree ferns, and require more soil to grow in, of an open peaty nature, to allow them to develop their luxuriantly beautiful fronds.

Along with the filmy ferns several other species of ferns, that love shade and moisture, may be grown with advantage, such as the *Adiantum capillus-venereis* for instance; also some of the Selaginellas, such as *S. denticulata*, *S. helvetica*, and *S. Martensii*, may be grown as a variety to the general arrangement, but do not let the mosses get unruly; keep them within bounds, so that they may not choke or interfere with the ferns.

The Australian Pitcher-plant (*Cephalotus follicularis*), the Side-saddle plants (*Sarracenia*), the Fly-trap plants, and many other curious plants, may be grown with advantage along with the filmy ferns.

The cultivation of filmy ferns may be summed up in a few words. Give them plenty of moisture; keep them nearly close, allowing the air to circulate only through the open crevices at the top of the case, which must be loosely put on; give them plenty of drainage, and never allow the nearest approach to stagnation to take place; keep them from sunlight, and give them the benefit of a little shade when the light is strong; and give water and admit air periodically as they require it. You can always admire their exquisitely delicate and transparent forms of growth without the necessity of handling them. They cannot stand handling, but they will stand any amount of admiration through the glass walls of their humid little dwelling.

POT PLANTS FOR WINDOWS AND THE RIVALRY OF SPECIMENS.

I am well aware that a great many people have not the opportunity or the means to possess a miniature greenhouse or Wardian case, but that need not prevent them from indulging in their love for pot-plants as long as they have a window. Many a splendid specimen plant may be seen in the cottagers' windows rivalling in health and beauty the favoured inmates of the greenhouse.

In places such as London and other large cities, where window-gardening has become so fashionable, a great variety of plants are grown, but in country towns and villages few seem to rise above the ambition of a scarlet geranium or fuchsia. It is a great pity this should be when there is so great a variety of plants as easily grown and quite as cheap. The red China rose, for instance, makes a grand window plant, when in bloom, and just as good, if not better, is the green and variegated *Hydrangea hortensis*, with its immense head of bloom, which lasts for months. Gems of the first water for pot culture are the hybrid *Begonias*. *Begonia Dregsi* is dwarf and compact with green foliage and a profusion of snow-white flowers; *B. Sandersonii* and *B. insignis* are the best pink flowering kinds; *B. lucida* and *B. manicata* the best with rose-coloured flowers. Then there are the Myrtle, and *Calla Ethiopica*, or Lily of the Nile, and in fact all the plants and spring-flowering bulbs recommended for the miniature greenhouse.

I will also add several very desirable greenhouse plants, purposely kept out of the list, owing to the great height they soon reach, making them scarcely fit for the miniature greenhouse or plant case. First we have the *Acacia armata*, or prickly Acacia, an excellent pot-plant for windows; then the *Abutilon striatum* and *A. Thomsonii*, and the white-flowering variety, *Bircle de Neige*; they have heart-shaped foliage and lovely bell-shaped flowers. *A. striatum* has variegated foliage. The *Deutzia gracilis* is a pretty pot-plant with drooping white flowers. *Cytisus racemosus* has a profusion of yellow pea-shaped flowers, and much like it in flower but larger in foliage is the *Coronilla glauca*. Very good for window culture are some of the dwarfer-growing *Chrysanthemums*; they flower in autumn, and should be

grown outside, plunged in a border up to the rim of the pot till the flowers begin to open; then taken inside and placed in the window to flower. They require abundance of water always. After flowering they should be cut down and shaken out of their pots and the roots separated; you can then select as many nice little pieces as you may require to pot again for next year; keep them indoors till spring is advanced, and then plunge them in a border as before. *Clematis Jackmanii* and other varieties of hardy clematis make excellent window climbers grown in pots or tubs, and trained as they grow round the window. They can be grown either inside or outside, though outside is preferable. They require to be cut down every year and fresh soil given. They have a splendid appearance when in flower around a window. *Ivies* are grand window climbing plants. The *Golden variegated Ivy* especially is quite a gem for the purpose. The *Scarlet honeysuckle* and the *Virginian creeper* are also very good window climbers.

Rustic brackets may be designed and placed on the walls of the window recess to hold flowering plants. The most suitable plants for them are the *Saxifraga sarmentosa*, or Aaron's beard, and *S. Fortunii*, the blue and white *Lobelias*, Ivy-leaved *Geraniums*, *Musk plant*, *Creeping Jenny*, *Tradescantia zebrina*, and any other hanging plant that would droop over and hide the pot.

I can fancy how beautiful a window of this description would be with several nice pot plants on the sill; a *Clematis Jackmanii* blooming gaily overhead, other climbers up the sides, and a hanging basket both within and without the window well furnished with hanging plants, and pots of blue *Lobelia* or *Musk* on the side brackets, all combining to form a beautiful and harmonious picture which would be a pleasure to every beholder. This can all be done with very little expense; it only requires taste and patience to work it out. The expense and trouble are nothing to the pleasure you will experience.

There is one little thing in plant growing which you should always be particular about, that is, the correct labelling of your plants. Although you should have their names correctly in your memory, it is always the proper thing to have them legibly written on a label and stuck in the side of the pot, immediately between the pot and ball. A piece of lath or white deal not above three-fourths of an inch in width, cut into a neat shape, and six inches long, pointed at the end for insertion, with the sides smoothed to write upon, makes a capital label. Before writing on it give it a very thin coat of white paint; this makes the pencilled name stand out clear, and prevents it from being obliterated. The name should always be written down the label in a plain round hand, and in two lines if the name be lengthy. Of course wooden labels will soon decay at the inserted ends and have to be renewed; to avoid this an imperishable label can be made of zinc, cut into the same shape. This you may write upon with ink. There is an indelible ink that never fades sold by the seedsmen for this purpose; you can also purchase from them Yeate's No. 15, or Erfurt potting label made of zinc, just the label

you require, for two shillings per 100. There are several other styles of Yeate's suspending and potting labels to choose from. And you can purchase the common wooden pot-labels at sixpence per 100, neater made, I dare say, than you could make them yourself, and the trifling outlay would save you the trouble of making them.

A very neat way of labelling plants is by means of small zinc or wooden labels, with only a number written on them, corresponding with the number entered in a little book, giving the botanical name of the species and variety, with the commoner name it may be known by, and the day and date when the specimen first came under your care, and any other little details connected with it you may wish to remember. A little historical book of this description is most interesting, both to yourself and your friends. Under the heading of this or that fern, for instance, you may have reminiscences noted down of some past holiday spent in some of the lovely spots among the hills, valleys, woods, and streams of the glorious open country; a holiday that has left the mind full of happy incidents that will crop up in your sleeping and waking dreams for ever after.

The rarer kinds of wild ferns are generally found in secluded and sometimes almost inaccessible localities. There the rambling tourist often commits wanton destruction, unthinkingly pulling up the rare and beautiful little ferns in handfuls to please a passing whim, or to have remembrances of his visit to the locality. Ten to one the poor ferns perish, their spoilers having no idea how to take care of them. If they are still fresh when they reach home they put them into a pot, in any sort of way, where they die the slow death of starvation and bad treatment, and then are thrown out as useless. I would advise such people to let the poor ferns grow in their own quarters. It is useless to pull them up unless they know how to treat them well, and are willing to do it. A few fronds preserved and dried would suit their purpose just as well, and leave the locality no poorer in its rare possession. Skilled fern cultivators will know how to gather a rooted specimen without unduly destroying more than they take away.

INVADERS, VISITORS, AND SETTLERS IN OUR GARDENS.

(Continued from page 347.)



AND now let us fancy ourselves taking a walk round some garden with those who have been our readers, and let us pass in review some of the living creatures of whose lives and works we have endeavoured to give a history. If our walk be in the early morning, while grass and leaves are still damp with dew, we shall be very likely to meet with the "Slow One" of our first paper, going home, perhaps, after his breakfast on juicy leaves of some kind, and we know that he will soon be shut up in his shell, and stuck fast against the smooth sur-

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face of some stone or tree bark, quietly digesting his food, while he makes a little addition to the size of his shell. We may see, too, many "Spinners and Weavers," seated in the midst of their delicate, glistening webs, waiting for flies, or if the owners of the webs be not there, we know that they are in nooks close at hand, most carefully concealed, but from out of which they can easily run down to seize on their prey; and we may notice how cleverly the weavers of the great wheel-shaped nets have contrived to moor them with long lines of web to some distant objects, and may calculate how many times their own length are some of those lines which they have ejected from their tiny spinnerets. We pass on, and may contrive to see the Three-lived Ones in each of their states: as caterpillars, feeding on the leaves of plants and vegetables; or hanging to boughs or ledges of palings, in their pupa, or chrysalis state; or meet them in their most perfect form, as lovely butterflies, fluttering about among flowers, or just resting on them long enough to send down their long drinking tubes into their nectaries. As we tread the gravel paths, we are sure to notice some doings of the "Underground Workers,"—some piles of earth thrown up while they have been excavating a cave-city, or we may see a long procession of them crossing a path, some going one way, and some another, an important business no doubt; very busy and very fussy, and yet stopping occasionally to touch feelers and have a talk; or we may see where a number of them are making their way up the stem of some standard rose-tree, in order to "milk their cattle;" that is to say, take from the green aphides on the rose-buds and stalks the sweet honey-dew. We see here and there and everywhere that flowers and blossoms are to be found, the "Busy Ones" collecting honey and pollen, dipping their flexible tongues now into this flower-cup and now into that, and burying themselves in others so deeply that they come out white, or red, or yellow, with pollen, which is to be kneaded at home into bee-bread. During all the time of our walk we hear the cheerful trills, and twitters, and sweet notes of countless birds, and see them busy in their search after food, while we know that most of them have snug little nests in the trees and shrubs, and amid the ivy on walls about us, filed with young fledglings whom they never forget to provide for. As we pass a strawberry bed, we may chance to see some frog waiting, with his large mouth and long tongue, ready for trapping flies; or may chance to come upon a mole, who may have ventured up from his burrows underground. Even when we walk about our gardens in winter time, when all seems so still and quiet, we may remind ourselves of how much life there is still around us, or provision for future life. Ants down in their subterranean cities, taking their long winter sleep. Bees also dormant in their hives. Little mice snug and dozing in their warm nests; while in every nook and cranny of tree-trunks and branches, and in chinks of palings and walls, are eggs and pupæ of all manner of insects, waiting only for the warmth of spring to bring them into life.

And as we are reminded of all the creatures whose history, or even a portion of it, we have read, and whose ways we have been led

to observe, we cannot but reflect with wonder on the abundance of life, and the endless variety in the forms and modes of life to be observed even in the creatures who are to be found within the compass of a garden. We have seen, too, how their bodies and all their powers are most wonderfully suited for the support and preservation of their lives. We have learnt that not only can each creature provide for itself, but has the inborn knowledge and impulse which we call *instinct*, prompting it to take most tender care of its young, or leading it to provide for its offspring beforehand, whom it will never see or know. We have seen how curious and marvellously skilful are some of the works of these small creatures for all these purposes—the web of the spider, the cell of the bee, the cocoon of the caterpillar, and the nest of the bird; and we know with what fidelity and unwearied patience and industry they employ all the capacities and powers given to them by nature; all which cannot fail to inspire us, not merely with love for them, but lead us to feel something like respect for these, our little fellow-creatures, who, like ourselves, have received so many tokens of the loving-kindness and tender mercy of Him “who made and loveth all.”

THE GARDEN GUIDE FOR DECEMBER.

THE FLOWER GARDEN.



HERE is little to do, beyond keeping everything as tidy as possible. Bulbs ought to be all planted by this time, but if any remain out of the ground, get them in without delay. Take up tea roses, and lay them in by the heels in a shed, out of reach of frost. Cut down fuchsias that are to remain out all the winter, and cover their roots with litter or coal-ashes. Pansies, pinks, and other choice things in open beds, should have a little light litter sprinkled over them in frosty weather, or be protected with canvas on hoops. Tulips protect in the same way. Look over auriculas and other plants in frames, and take off dead leaves, and keep the plants moderately dry, and as freely ventilated as the weather will permit.

KITCHEN GARDEN.

As alterations and improvements proceed, let not the important work of draining be forgotten. Plantations of rhubarb, seakale, asparagus, and horse-radish, may now be made. A lot of roots of the common dandelion, packed together in leaf-mould, and put into gentle heat, and the daylight wholly excluded, will furnish a delicate salad in five or six weeks. Pascall's seakale pots are best for the purpose. Get together everything available for manure, and keep each kind of manure as separate as possible; and, as far as possible, keep dung and all soluble matters under cover, for they lose much of their properties by the action of rain. Though there is little, apparently, that calls for exertion in the kitchen garden, the lover of tidiness and order will find plenty of occupation in getting sticks and stakes tied up in bundles, and ready for use; turf, and weeds, and other litter to the muck-pit; manures turned, and composts prepared; pots washed and sorted over, and crocks sifted into sizes for the potting bench.

FRUIT GARDEN.

Hurry on the planting, so that the stock shall not be suffered to perish by

that killing process, known as "laying in by the heels." Dig round old fruit trees, and lay down a layer of old dung, six inches thick, in a ring, three feet round the stem of each. Root-prune any trees that grow too luxuriantly to bear well. Give protection to any tender fruit trees, and lay boards in a slope over vine borders, to shelter them from excessive cold rains. Unnail from the walls the younger shoots of tender wall trees, to prevent premature breaking. Strawberry beds may be made this month, and is preferable to leaving it till February.

GREENHOUSE AND STOVE.

Continue to force shrubs, hyacinths, and the hardier kinds of early blooming greenhouse stock. During foggy weather, a little fire-heat will be useful during the day, even if the temperature is not very low, for it allows a little ventilation, and a change of air is essential to the keeping of the plants in health. Plants to be forced should be put in the greenhouse before they are placed in the stove, for too sudden a heat is sure to exhaust them and cause many flower-buds to break into leaves. Remember that after frost we always have damp, and this will do much mischief unless a brisk fire be made up and air given to dissipate it.

TO CORRESPONDENTS.

FIG-TREE.—*J. McD.*—We should advise you to remove all the largest of the fruit, and leave only on the tree those that are no larger than peas. If these get through the winter they may furnish a fair quantity of ripe figs next season. Should we have a severe winter, the largest fruit will be the first to suffer, and the longer they remain on, the more they exhaust the tree, and interfere with the production of the first crop next year; so remove them at once. Protection during sharp winds without frost can be given by a breadth of Haythorn's hexagon netting, and Russian mats added during frost, the whole removed during mild weather.

ROSES NEWLY BUDDED.—*Passiflora.*—Trim in all wild growth moderately, but do not cut in any closer the shoots that are budded. In March, cut back every budded shoot to one wild bud above the inserted bud, and let that wild bud grow till the inserted bud has started well, when it may be removed close over the newly-formed shoot of the rose. The wild bud left is called the "sap-bud," and its duty is to draw the sap to the inserted bud, and thus assist it to get its own living.

PEONIES.—*Clara.*—Herbaceous Pæonies should be planted so that the plump buds, which are to give leaves and bloom next season, are an inch below the surface. This will give the tubers a depth of six to nine inches. Be careful not to injure these buds in taking up, for the next crop of blossoms is wrapped up inside them.

FERNS AT REST.—*C. C., Chelsea.*—Ferns under glass should be occasionally watered in winter, though at rest. Your tank being shaded is all the better for fish. Perhaps a few fancy varieties of *Carex* would do best to grow in it. Try *Arundo donax variegata* in a pot plunged all the summer.

LIME FROM GAS-WORKS.—*Subscriber.*—Refuse lime from gas-works is exceedingly fertilizing, and may be used to any kitchen-garden crops.

PEACH AND NECTARINE TREES FAILING.—*F. W., Carshalton.*—Your trees are probably suffering from stagnant moisture in the soil; make a drain at the distance of six feet from the wall, two feet in depth, lay a row of drain pipes or tiles at the bottom, over them nine or twelve inches of brickbats, or any coarse rubble, and make sure of an outlet for any water that may accumulate in the drain. Then begin at one end of the border, take up all the trees carefully without exception, cut off all diseased and rotten roots, and lay the trees in some safe place while the border undergoes renovation. When the trees are all up, lay an inch or two of good stiff loam all over the border, from the wall to the drain; then begin at one end, and turn over the soil fifteen inches deep, incorporating the new and old soil well together, and lay it in three sharp ridges, so that as

much surface as possible may be exposed to the action of the atmosphere; let it lay a fortnight in this position, when give the whole another turn over, still preserving the ridge fashion. After having laid another fortnight, if the weather is open and genial, the border may be levelled down and the trees again inserted in their proper places, taking care in replanting that the roots are only just covered. If the above plan is carried out, we do not anticipate that the trees will suffer in future from excessive moisture.

GOOSEBERRY TREES.—*Stonehenge.*—Gooseberry trees may be removed at any age if done with care and early in the season. To renovate the trees cut out a few of the leading branches to the base, and at the same time manure the roots liberally. The better plan would be to cut back severely one season and transplant the next. In the meantime it would be as well to cut a trench half round every tree at fifteen inches from the stem and two feet deep, and fill in with new rich soil. This will cause the formation of new roots on one side of all the trees, and will be a great help the next season in the moving. Another important step with a view to the future, is to put in a lot of cuttings, so as to get up a stock of young trees, and allow of the destruction of the old ones, if they refuse to be renewed.

TUBEROSE.—*Polly.*—Pot the bulbs as soon as obtained, giving them a rich sandy soil of the same quality and consistence as is used for hyacinths. When potted they should be set aside in a warm place for a fortnight, and then be placed on a flue, tank, dung-bed, or elsewhere, and have a bottom-heat of at least 60°. They do not generally succeed well in the stove, because it is the bulb rather than the top that needs warmth. Give plenty of water, and the flowers will appear in due time. As soon as they are sufficiently advanced to be attractive, take them to the drawing-room; and when the bloom is over, throw the bulbs away, as there is no certain way of obtaining flowers of the tuberoses but by procuring fresh bulbs every year.

BROCCOLIS.—*R. S., Chester.*—To secure a constant succession of broccolis, sow every three weeks from the middle of March to the middle of July. The first sowing should be Snow's and Purple Sprouting, to come in the next spring. The second sowing to be Brimstone, Elletson's, Purple Cape, and Granger's. The third sowing to be Granger's, Snow's, Conning's, and Tamworth. Early in May sow Walcheren, Granger's, and Barking. End of May sow Walcheren and Purple Cape. June and July sowings to be Walcheren only.

GRAPES SHRIVELLING.—*Polly.*—The fault of your grapes is that at a certain stage their growth is arrested. We have no hesitation in tracing the cause to the roots of the vines, and the remedy will be found in the renewal of the roots. It is highly probable that the vines are in a damp cold border, and that in consequence the roots are not able to keep pace with the demands upon them by the leaves of the vine; and thus the supply of sap being insufficient, it is impossible for the fruit to swell to proper dimensions.

SMALL GREENHOUSES.—*H. M., Upper Norwood.*—Small greenhouses require more skilful management than large ones. They get too hot when the sun shines, and too cold during frost; if well ventilated, they are often draughty; and close and suffocating, if not well ventilated. Houses of less than thirty feet in length by twelve feet wide demand more than ordinary care. Your little house of nine feet by seven, with no sun on it after the middle of the day, is really not fit for pelargoniums, fuchsias, and other first-rate greenhouse plants, but it would answer admirably for a small collection of ferns. It might be made very pretty by throwing up within it some banks of good peat, and facing them with burre, and then planting ferns in it.

TRITOMA UVARIA.—*Captain W.*—This is perfectly hardy, and requires the simplest culture. It likes a deep rich soil, and is propagated by seed and division of the plant, which generally produces abundance of offsets. These offsets, if taken off after the plant has done blooming, potted in well enriched loam, and placed in a cold pit or cool greenhouse, and shifted on as they require till the end of April, will make fine blooming plants next year.

