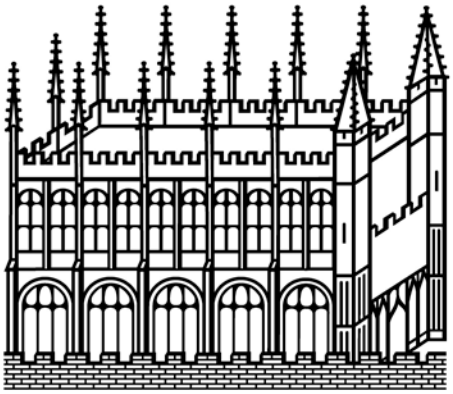

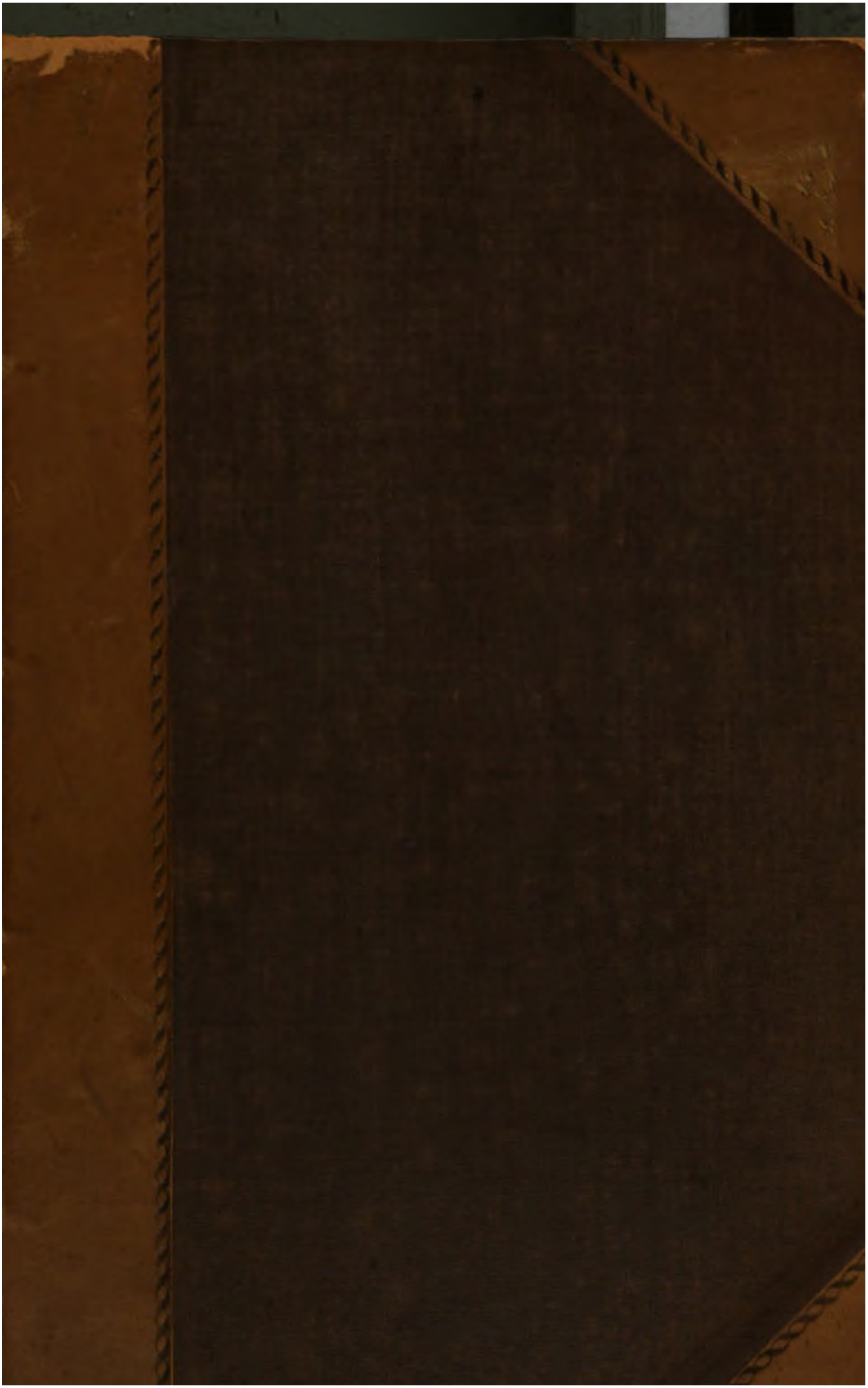

THE

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By CHARLES Mc. INTOSH, C.M.C.H.S.

Late Gardener to the Right Honorable the Earl of Braedalbane, and Sir Thomas Baring, Bart. M.P., &c. &c., and now Head Gardener to H. R. H. Prince Leopold of Saxe-Coburg Saalfeld, at Claremont.

VOL. II.

LONDON:

PRINTED FOR THOMAS KELLY, No. 17, PATERNOSTER-ROW.

1829.

Printed by J. Rider, Little Britain, London.

MONTHLY OPERATIONS

OF THE

FORCING GARDEN.

JANUARY.

PINES.

ALL those cultivators who have attained the greatest celebrity in the cultivation of this fruit agree in the necessity of having three distinct divisions, or compartments, suited to the different stages of their growth. One for crowns and suckers; one for those in their second stage of growth, generally termed succession-plants; and a third for the plants when fully established, and in which they are to perfect their fruit.

The necessity of these separate pits, or divisions, is proved by the plants requiring different modes of treatment during their growth, particularly as regards temperature.

Climates in which the pine is indigenous, have not this variety of temperature, it not being necessary in nature. The growth of the plant from the seed, suckers, or crowns, proceeds at all times of the year as they may happen to be stuck into the ground. This slovenly mode of culture never brings this incomparable fruit to that state of perfection, which we often see it in the pine-stoves of this country; and even here we have it in higher perfection and flavor, than it is ever found in a cultivated state within the tropics.

Although the pine is a native of warm climates, it is not so tender as many imagine. They will bear a much higher degree of heat, for almost any length of time, than most fruit-bearing plants in cultivation, and will also, without injury, bear a degree of cold that would be death to any other exotic fruit, while in a state of vegetation. They are liable to be

attacked by insects, in all stages of their growth; the most annoying of which are the white turtle insect, (*Coccus Hesperidum*, Linn.) the white scaly insect, and the white mealy crimson-tinged insect, the last of which is the worst, as it attacks the plant from the top of the crown to the remotest parts of the root. Although difficult to clear of such enemies, still they will bear them, without sustaining much injury, longer than almost any culinary vegetable will withstand the attacks of the insects natural to them. Of natural diseases this plant has few, and we find it producing its fruit under a greater variety of bad culture, than almost any other cultivated fruit.

A variety of opinions have of late been entertained, whether this plant should be cultivated in a bottom heat, that is, whether the pots in which the plants are planted should be plunged into substances, either in a state of fermentation, or rendered more or less warm by means of fire-heat, steam, hot water, &c., or whether it should not be cultivated without such bottom heat, or at least only to a temperature approaching to that of the natural warmth of the soil, in which it grows in its native country. When first introduced into Europe, it was cultivated, as we might naturally suppose, without any such bottom heat; and the Dutch gardeners, who first attempted its cultivation, placed it upon stages with their other succulent exotics. Ingenuity, however, soon suggested, and experience approved, the advantage of plunging the pots in which the plants are planted in a mild bottom heat. Pines, however, do not require so strong a heat at their roots, as many keep them in, yet there is something so congenial to their natures, in being plunged in a moist mild temperature, that those, who have attempted their cultivation to any extent without it, have generally failed not only of producing fruit of any size or quality, but are unable to keep the plants in a healthy growing state. It is true that no plant is found in a state of nature growing in a soil warmer than that of the superincumbent atmosphere; but in cultivating many of our fruits and vegetables, we are not to imitate nature as the best mode of culture. If such were the practice, what would our asparagus, cabbage, and many other of our most valuable vegetables be? and if we were to grow our celery in ditches, should we be rewarded

with that highly useful and delicate salad in a state so good, as that where it is cultivated in the usual manner? Although pines will grow without bottom heat, still we have the experience of many years, and also of many intelligent cultivators, that they will grow in bottom heat much better; and although the heat of the soil in which the pine grows in its native country may never exceed, and seldom equals that of the surrounding atmosphere, yet it does not follow that earth heated to a greater degree may not be of service to it, in an artificial state of cultivation. Our indigenous plants, *Crambe Maritima*, sea-kale; and some others, are brought to the greatest perfection, by being cultivated in a temperature much higher, in proportion to their natures, than has ever been attempted with the pine. The conclusions drawn by an intelligent writer upon this subject are in exact correspondence with our own. "It appears from nature," says he, "as well as from observing what takes place in culture, that the want of a steady temperature and degree of moisture at the roots of plants, is more immediately and powerfully injurious to them than atmospheric changes. Earth especially, if rendered porous and sponge-like by culture, receives and gives *out air* and heat slowly; and while the temperature of the air of a country, or a hot-house, may vary twenty or thirty degrees in the course of twenty-four hours, the soil at the depth of two inches would hardly be found to have varied one degree. With respect to moisture, every cultivator knows that in a properly constituted and regularly pulverized soil, whatever quantity of rain may fall on the surface, the soil is never saturated with water, nor in times of great drought burnt up with heat. The porous texture of the soil and sub-soil being at once favorable for the escape of superfluous water, and adverse to its evaporation, by never becoming so much heated on the surface, or conducting the heat so far downwards as a close compact soil. These properties of the soil, relative to plants, can never be completely attained by growing plants in pots, and least of all by growing in pots surrounded with air. In this state, whatever may be the care of the gardener, a continual succession of changes of temperature will take place in the outside of the pot, and the compact material of which it

is composed being a much more rapid conductor of heat than porous earth, it will soon be communicated to the web of roots within. With respect to water, a plant in a pot surrounded by air is equally liable to injury. If the soil be properly constituted, and the pot properly drained, the water passes through the mass as soon as poured on it, and the soil at that moment may be said to be left in a state favorable to vegetation; but as the evaporation from the surface and sides of the pot, and the transpiration of the plant proceed, it becomes gradually less and less so, and if not soon re-supplied, would become dry and shrivelled, and either die from that cause, or be materially injured by the sudden and copious application of water. Thus the roots of a plant in a pot surrounded by air are liable to be alternately chilled and scorched by cold or heat, and deluged or dried by a superabundance or deficiency of water; and nothing but the perpetual care and attention of the gardener, to lessen the tendency to these extremes, could at all preserve the plant from destruction. To lessen the attention of the gardener, therefore to render the plants less dependent on his services, and, above all, to put a plant in a pot, as far as possible, on a footing with a plant in the unconfined soil, plunging the pot in a mass of earth, sand, dung, tan, or any such material, appears to us a most judicious part of culture, and one that never can be relinquished in fruit-bearing plants with impunity. Even if no heat were to be afforded by the mass in which the pots were plunged, still the preservation of a steady temperature, which would always equal the average temperature of the air of the house, and the retention, by the same means, of the steady degree of moisture, would, in our opinion, be a sufficient argument for plunging pots of vigorous growing or fruit-bearing plants."

Mr. Knight, in several papers in the Horticultural Transactions, has endeavoured to establish the practice of growing pines upon stages, and otherwise, without bottom heat; but in this practice he has not equalled, far less excelled, the most indifferent pine-grower in the country. Example is better than precept; and until Mr. Knight has proved by example his mode of culture to be superior to that so long approved of by practice, his converts must be few. However, this emi-

nent horticulturist deserves well of his country for any experiments he may make; he has made many, and some highly useful, and, much to his credit, he has performed them at his own expense, so that if he fail in some, it is but a natural consequence which falls to the lot of man. However, he has succeeded so far by his own confession, in one important object, namely, in initiating a novice, an ignoramus, or, to use his own words, an "extremely simple laborer, who does not know a letter or a figure, and who never saw a pine-plant growing till he saw those of which he has the care," to understand their culture as well as he does himself.

Attempts to cultivate pines, without bottom heat, have been tried by several gardeners, both on the continent and in this country, and have been abandoned without the least hope of success.

The necessity of a mild bottom heat being urged, we will now proceed to consider the most economical agent to produce that effect; as economy in the production of every article of horticultural produce should be the first consideration of the practical gardener, provided the result will be equally good with that of more extravagant methods.

Tan, or tanner's bark, has been longest and most universally used for forming a bed in which to plunge the pines in pots, and also to plant both crowns and suckers while still without roots. In using tan, it should be well sweated and frequently turned over previously to putting it into a new pit, so as to reduce it into a half-rotten state; and, in adding new bark at any time, in shifting the plants, or regulating the temperature of the bed, there should never be a great proportion added at one time, seldom above one-eighth of the whole. In putting in the new tan, it should be well kept down in the process of trenching and mixing the whole, and bringing up twelve or fifteen inches of the old tan to the surface in which to plunge the pots. When much of the old tan appears decayed and reduced to mould, it should be sifted, and the finer parts rejected and carried out of the house, and the coarser remains mixed along with the rest in the bed. To keep up a regular temperature, the beds will have to be stirred up, and fresh tan added, in such portions, and at such periods, as

may be thought necessary for the purposes required; and when peculiar circumstances require a speedy augmentation of heat, without displacing the pots, as when the fruit is to be swelled off in the last stage, at which time the roots of the plants will generally be extended into the bed, and would be seriously injured if disturbed, the more decayed tan at the top may be removed in part carefully, and a coat of new tan substituted: this is also often practised when the heat of the bed declines, and the state of the weather, or other circumstances, prevent a thorough turning over of the whole. When the tan gets too dry at any time, which it will be apt to do near the flues, water should be poured upon it occasionally between the pots, which will cause a fine moist heat to arise among the plants, which is always desirable in pine-stoves, and will likewise enable the tan to retain its heat longer than if it were suffered to become dry; for no vegetable matter will continue in a state of fermentation after the moisture has evaporated. Besides, it will prevent the chance of the dry tan igniting, which is sometimes the case near the flues, admitting that there should be a cavity or space between the bricks that compose the flues, and the tan-bed.

Tan should always be partially dried before put into the bed; and if kept in an open airy shed, for a week or more before using, so much the better. Heat thus produced will last, with very little trouble, from three to six months, when it is again put into fermentation, by adding a proportion of fresh tan, as stated above.

Where tan is difficult to be procured, and where oak and other tree-leaves are to be had in plenty, the bed may be composed chiefly of leaves, or a mixture of leaves and stable dung, using a little tan to surface the bed with, in which to plunge the pots. In using leaves of trees, either alone or mixed with dung, tan, or any other substitute, it is necessary that they be well fermented before they are carried into the pine-house or pit, that the rank heat may be so far extracted from them. They will, in this case, keep to a much more steady heat, and last much longer without renewing.

Leaves for this purpose should be chiefly composed of oak-leaves; for experience has taught us that they are more dur-

able in fermentation than any other; however, beech, hornbeam, and Spanish chestnut, are nearly as good. Those of ash, all sorts of fruit-trees, horse-chestnut, and lime should be rejected, if plenty of the others can be readily procured. They should be collected as soon as they fall from the trees in sufficient quantities, or as soon after as is practicable, and be gathered into large heaps in different parts of the woods; or, if there be convenience, they will be more handy, if brought at once to some place near to the forcing-houses or pits. There should be a neat inclosure formed, capable of containing a sufficient quantity for the season, open at top, and the sides secured with boards four or five inches broad, and three or four inches apart from each other, with a gate sufficiently large to allow a cart to go in and out, for the convenience of filling the place with leaves, as well as for taking them out, if wanted, to a greater distance than it would be deemed right to convey them by any other means. This will prevent them from being blown about over the garden, and will render the place neat and clean. They will here ferment, and be at all times ready for use; if they should be put in very dry, which often is the case, they should be watered for the purpose of commencing fermentation, and it may be found hereafter necessary to repeat this watering. It would be very useful to have another place of the same dimensions, and similarly constructed, in which to place dry leaves; if well trodden when put in, they would keep for many months, and be extremely useful in summer for many purposes, and in the autumn following, before the leaves fall off the trees.

In putting them into the pine-pits, if they be dry, they should be watered and well trodden, so that they will not sink too much afterwards. When the pits are full of leaves, the plants may be plunged in them in the usual manner, or there may be laid a few inches of tan upon the surface, upon which, when properly levelled, place the pine-pots, filling up the spaces between the rows of plants, as the process proceeds, closely with tan. Two wagon-loads of tan will be sufficient for a large house, and will last for this purpose a season. If tan cannot be procured, saw-dust may be used as a substitute, or plunge them in the more decomposed leaves, taken from

the bottom of the pit or bed. The pots, when plunged into the bed made of leaves alone, are apt to become loose, the leaves binding together in heating, and thus shrinking away from them, thereby exposing the roots to the air, and permitting the heat of the bed to escape; whereas, when plunged in tan, saw-dust, or similar substitutes, this evil is obviated.

The heat produced by oak, or other leaves, is uniform, mild, and lasting, and seldom endangers the roots of the plants with too much heat, which is an important object; and if the leaves be put in, in good condition, they will keep up a sufficient temperature in most cases for six months, and will not require to be turned over so often as tan, or any other substitute, to refresh the process of fermentation. This will save much trouble and expense, preventing also the necessity of exposing the plants to heat and cold, by moving them about from one place to another. The roots of the plants will also penetrate through the holes in the bottom of the pots, and extend themselves a considerable way into the bed of half-decayed leaves.

From the appearance of the roots of these plants, we might naturally suppose that the plants derive nourishment from the half-rotten leaves, and also from tan in a state of decomposition; although A. Young, Esq., in his Essay on Manures, says, that spent bark seems rather to injure than assist vegetation, which he attributes to the astringent matter it contains; but every cultivator of the pine must have observed with what seeming pleasure the roots of these plants penetrate into half-rotten tan, as well as into leaves in a similar state of decomposition; indeed, many excellent cultivators root their pine plants in rotten tan only. Oak-bark is certainly highly charged with astringent properties, but is freed from that property by the operation of water in the tan-pit; and if injurious to vegetation, the effect is probably owing to its agency upon water, or to its mechanical effects. Many of our more rare Alpine plants thrive in rotten tan, when they will live in no other preparation which we can make for them.

Where tan cannot be very readily obtained, oak or other leaves are equally good for the fermenting purposes in the pine-pits; and, indeed, where it is even to be conveniently procured, we would recommend a mixture of both, as affording an ex-

cellent temperature, more lasting, and more uniform in its effects.

Leaves, after being too much decayed to be of further use in the process of keeping up a sufficient temperature, are, of all other species of manures or moulds, the most useful and generally used in a garden; and, when reduced to vegetable mould, are experimentally known to be the most natural of all vegetable food. Scarcely any seed refuses to vegetate in it, and many of our choicest flowers prefer it to all others. It enters into almost all compositions for fruit-trees and fruit-bearing plants, and is a manure suited to all soils, and under all circumstances.

Speechly, during the time that he was gardener to the Duke of Portland, brought the use of oak-leaves into notice as a substitute for tan, and used them to a great extent. He goes so far as to say, that a bed of them will retain sufficient heat during twelve months without turning, or any further trouble, and that those which have been in use for a season will, by an addition of fresh leaves, continue their fermentation still longer. It must be allowed, that any material, capable of affording a sufficient degree of heat for these plants, without renewal, for one season or more, would be a desideratum to the horticulturist; for, besides the saving of labor and expense, which, in large collections of pines, are considerable, the plants would be much less liable to sustain injury or checks in the operations of turning or renewing the beds, to which they are constantly liable, however carefully the operations may be performed. We have never, in our practice, been able to secure so long a continuance of sufficient temperature in one bed, without a renewal or addition; but we have uniformly found the heat from leaves to be much more permanent and regular, than that from any other material. It is only for plants in their last stages of growth, that is, from the time that they are potted in the sized pots, in which they are to perfect their fruit, that their remaining undisturbed is of the most consequence to them. Previously to that period, they would have to be frequently removed out of the bed, for the purpose of being placed in larger pots, at periods depending upon their state of growth, &c. Beds of leaves, properly fermented and made will retain sufficient heat, in most cases, from the time

that the plants are plunged in them for the last time, that is, from the time that they are shifted into full-sized pots, until they ripen off their fruit; and the same quantity of leaves, without addition, will continue their heat during twelve months, if turned over twice or thrice a year, or at such times as may be most convenient, when the plants are taken out for re-potting.

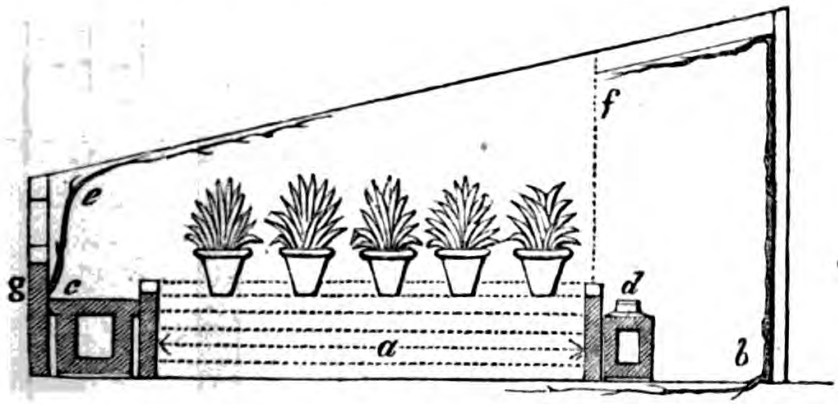
Pines are also successfully cultivated, without either tan or fire-heat, by means of dung only; for which purpose, beds are made of dung, after being properly prepared by fermenting and turning, and erected as is usually done for cucumbers, and a frame placed upon it similar to those used for growing that fruit, but of such dimensions as are suited to the size of the plants, whether they be nursing, succession, or fruiting. The pines are plunged in these beds as in the tan-beds, and managed accordingly. When the bottom heat declines, linings of hot dung are applied, in the usual way, to promote a continuance of heat; and when the whole mass becomes too much decayed, and too compact for the heat of the linings to penetrate freely, the plants are removed into others similarly prepared for their reception. By this simple means, pines have been grown equally well with those in expensive and lofty pine-stoves, and at a considerably less expense. Beds built of fagots, and covered with fifteen or eighteen inches of tan, leaves or saw-dust, and heated by means of external linings, answer equally well.

Dung-heat and fire-heat combined have been used by Mr. Jenkins of the Portman nursery, for several years. The heat imparted to the plants is by him produced from the fermentation of rank stable-dung, not at all prepared previously to using, in a vault below the plants; the top of which vault is covered with thin tiles, supported by means of iron-bearers. The joints of the tiles are closely cemented, to prevent the steam from getting into the house. The pots, in which the plants grow, stand upon the tiles without being plunged in either tan, or any other material; the heat penetrates through the tiles, and is found to warm the atmosphere of the house sufficiently for cultivating these plants. However well this plan has hitherto succeeded, there is no doubt but that if the

pots were plunged in tan, sand, or saw-dust, it would be of material advantage to the plants, by keeping both a more equal degree of temperature and moisture round their roots.

CONSTRUCTION OF THE PINE-HOUSE.

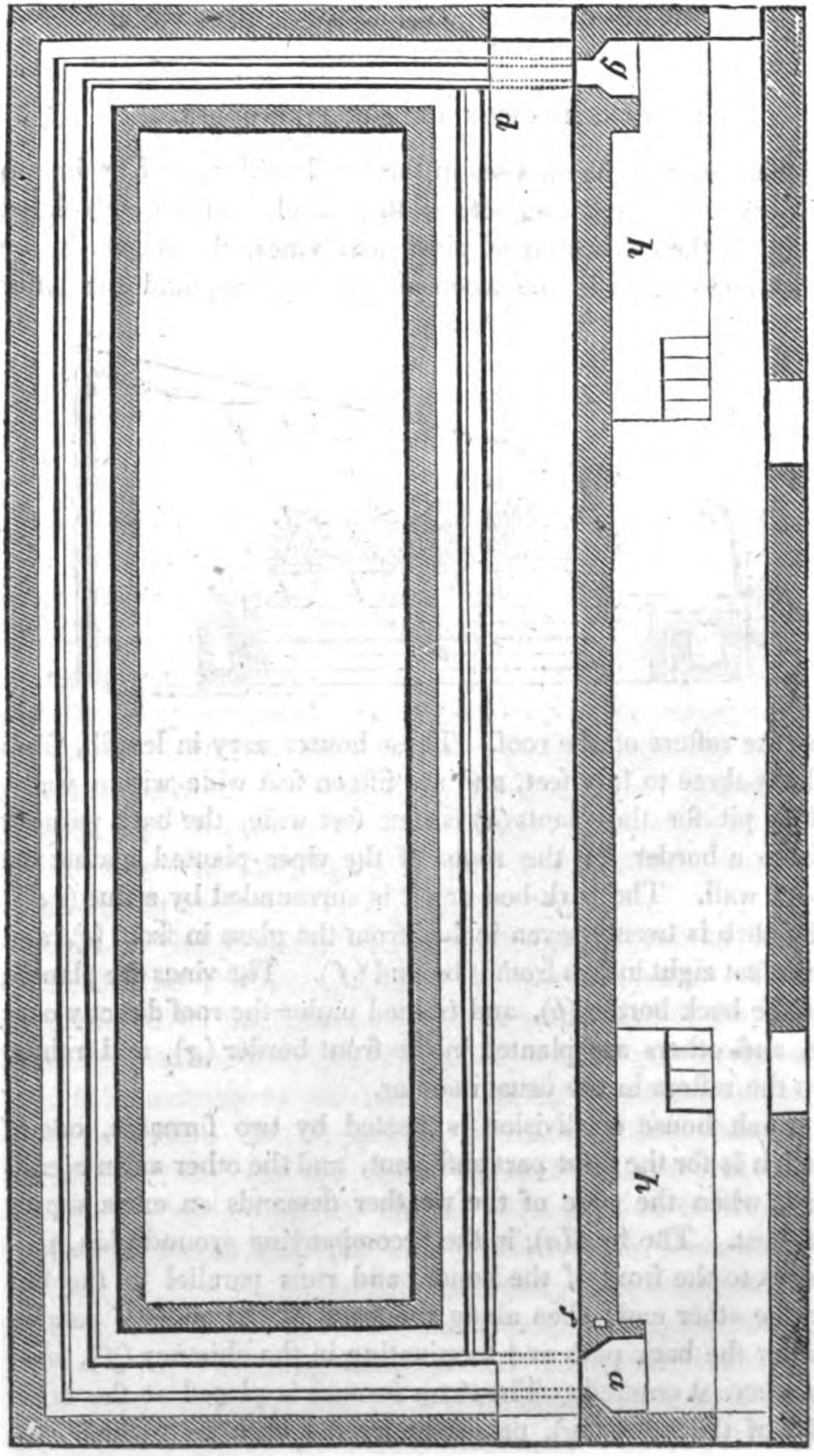
The fruiting pine-houses in the royal gardens at Kensington may be considered complete of their kind, and are calculated both for the cultivation of pines and vines, the former in the bark-bed (*a*), as in the accompanying section; and the latter



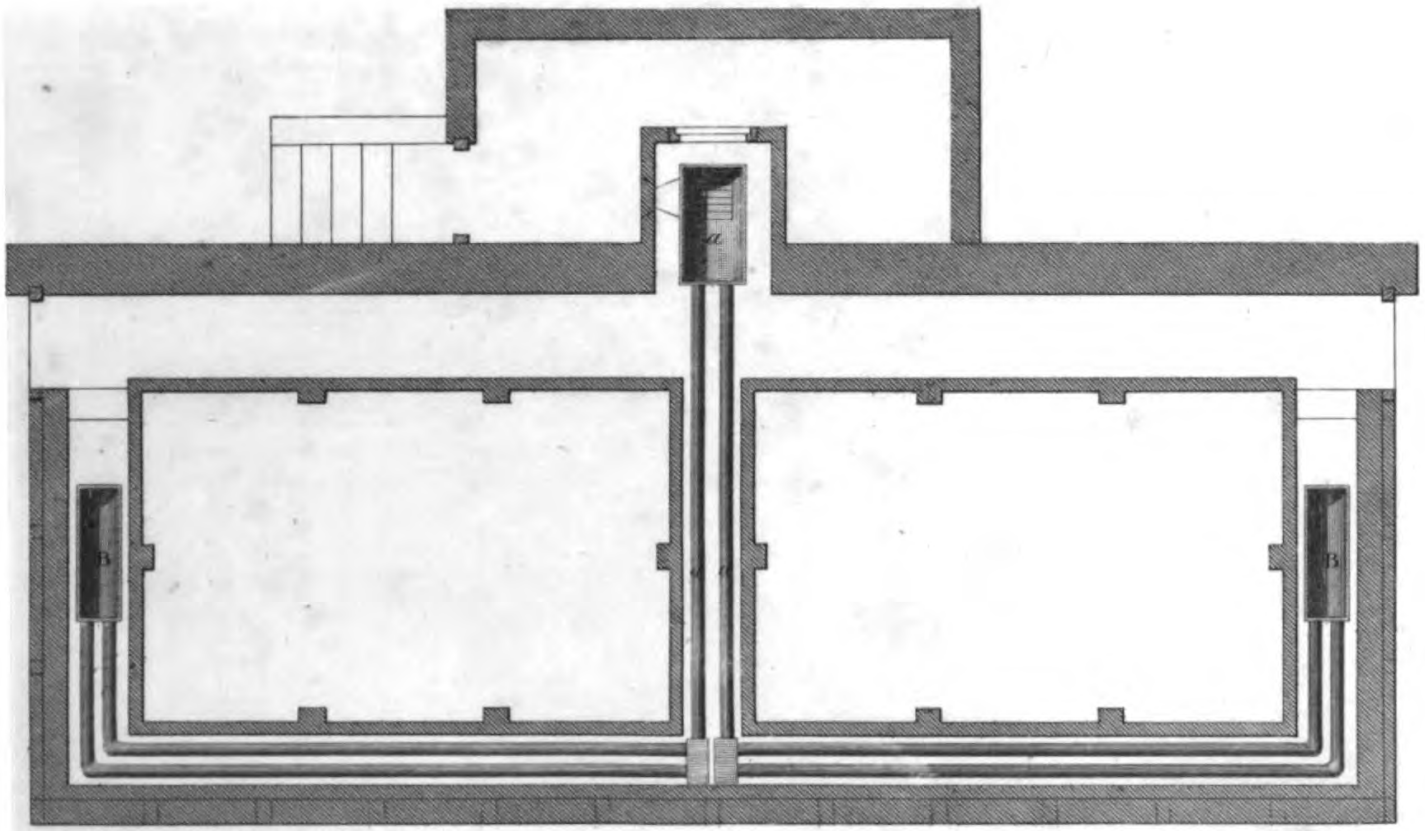
up the rafters of the roof. These houses vary in length, from thirty-three to fifty feet, and are fifteen feet wide within walls. The pit for the plants (*a*) is nine feet wide, the back path (*b*) forms a border for the roots of the vines planted against the back wall. The bark-bed or pit is surrounded by a flue (*c d*); the curb is twenty-seven inches from the glass in front (*e*), and four feet eight inches from it behind (*f*). The vines are planted in the back border (*b*), and trained under the roof directly over it, and others are planted in the front border (*g*), and trained up the rafters in the usual manner.

Each house or division is heated by two furnaces, one of which is for the most part sufficient, and the other as an auxiliary, when the state of the weather demands an extra supply of heat. The first (*a*), in the accompanying ground plan, proceeds to the front of the house, and runs parallel to the bed to the other end; then along the back of the pit (*d*), passing under the back path and terminating in the chimney (*f*), near to where it entered. The extra furnace is placed at the other end of the house (*g*), passes under the back path which con-

ducts it to the principal flue (at *d*), which it joins, and travels in the same tunnel, till it makes its escape at (*f*). As this



Plan



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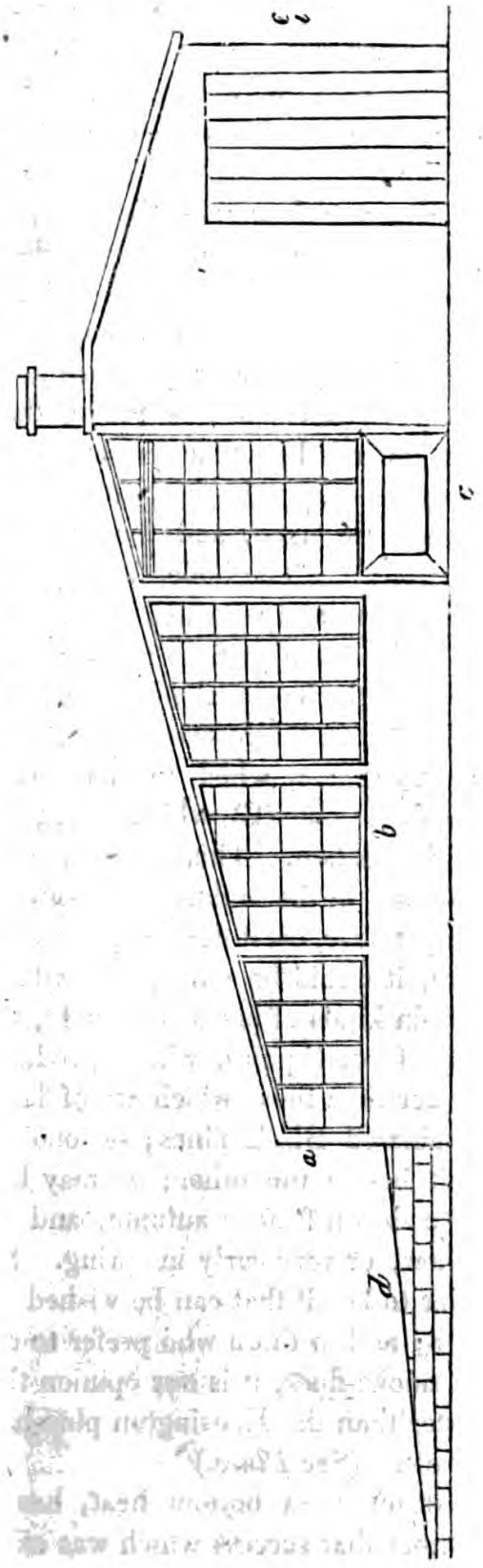
London Published by Thos Kelly Paternoster Row April 1st 1839

latter furnace is not often in use, its connection with the other is cut off by a damper, at the point of junction at (*d*).

The height of these houses is only nine feet from the ground to the top of the back wall. The rafters are of wood, as are also the sashes, and are placed at about four feet apart centre from centre. The front sashes (*a*), in the accompanying end elevation, are only one foot six inches high, and slide past each other in the process of giving air, the middle end sash (*b*) also slides for the same purpose. The *sill of* the door (*c*), and the back path of the house, are on a level with the outer surface of the ground. The front border (*d*) is raised above it considerably, a provision judged necessary on account of the damp bottom. The furnaces are placed in the back sheds, and are sunk three feet below the surface (*h h* in the ground plan), to give them a sufficient draught. Pine-houses constructed upon the above principle, have given the greatest satis-

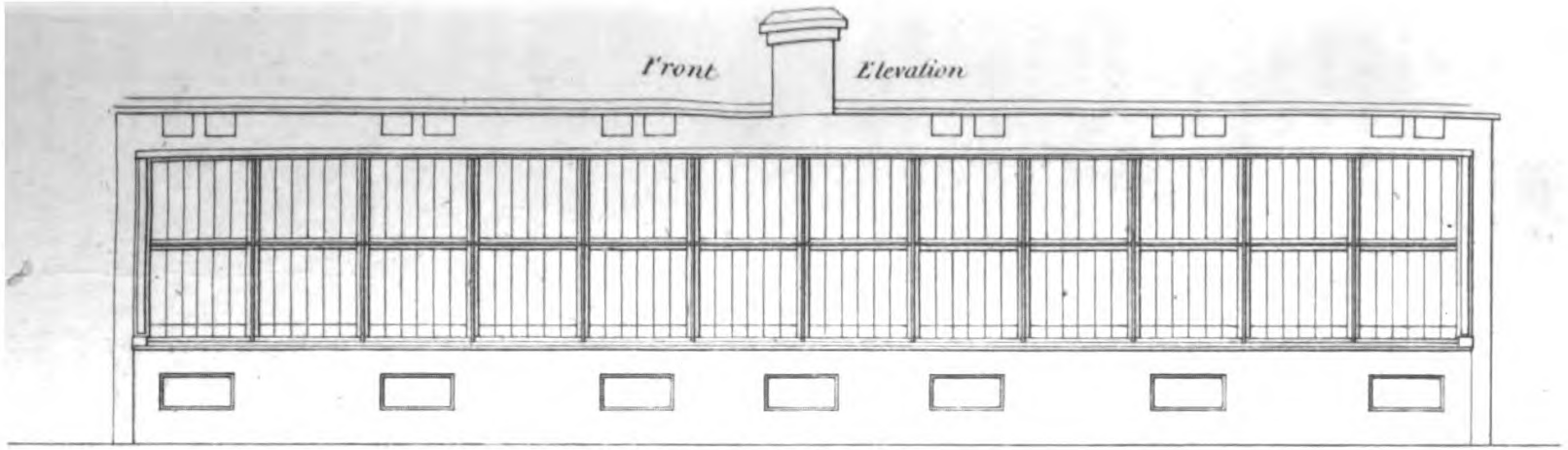


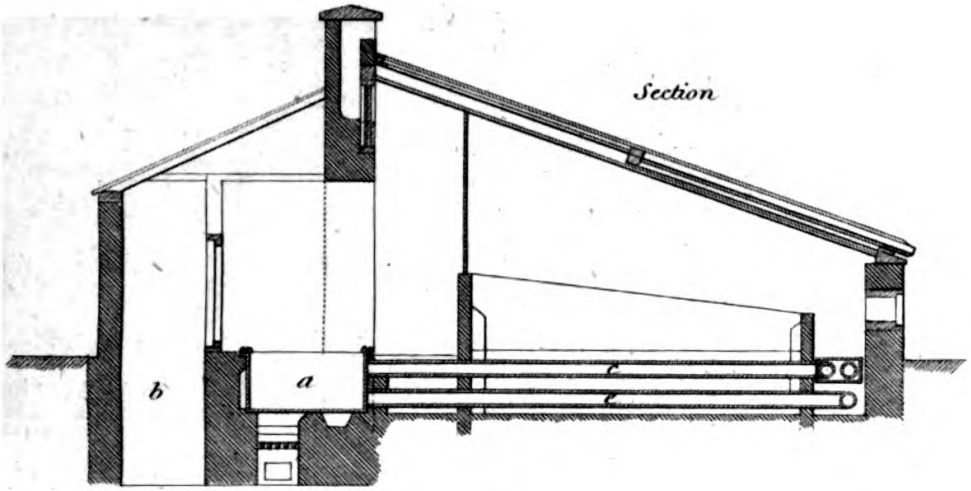
faction; and, we may add, that were such houses heated by hot water, according to Mr. Atkinson's method, they would be all that could be wished for, as far as the structure and mode of heating are concerned, in this important branch of gardening.

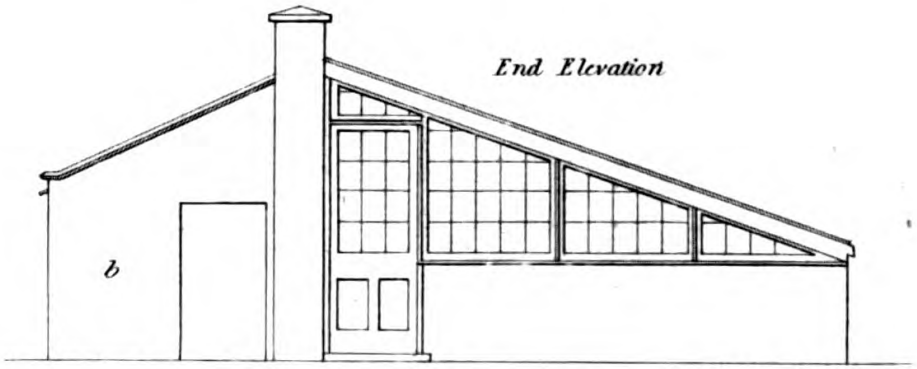
The accompanying elevation, sections, and plan, are of a pine-house, executed from the designs of W. Atkinson, Esq., and heated by hot water, and have been found to give the greatest satisfaction, and may be considered the perfection of the principle; the temperature here has been sufficient, under every circumstance, to prove, that the hot-water system, as recommended by that gentleman, is amply sufficient to bring to perfection "the king of fruits." In this house, the roof-sashes are fixed, and the air is admitted by the ventilators (F and G). The boiler (*a*) is placed in a niche in the back of the house, and is heated and managed from the sheds behind. The pipes (*d d*) convey the heated water from the boiler to the front of the house, along which it travels to the ends, and heats the water in the reservoirs (B B), or rather displaces the cold water in them, which finds its way back to the boiler through the single pipe (E), which it enters near its bottom, as is shown in the section. This house may either be divided by a glass partition in the middle, and both divisions kept up to an equal temperature, or, if desired, it may be all in one. In the former case, it would be convenient, when it may be desired to grow certain kinds of pines separately, one, for instance, being filled with Queen pines, which produce their fruit many months sooner than those which are of larger size, and generally denominated Black pines; or one division may be started into fruit before the other; or may be dedicated to those which have shown fruit in autumn, and are intended to ripen late in winter, or very early in spring. Such houses as this, we consider to be all that can be wished for, in the cultivation of the pine; and to those who prefer to continue the mode of heating by smoke-flues, it is our opinion that none answer the purpose better than the Kensington pine-houses, recommended in this article. (See *Plate.*)

Steam, as a bottom heat, has been repeatedly tried, but without that success which was expected. This was predicted

Vine Houses.







0 1 2 3 4 5 10 20 30 40 50 Ft.

by Speechly and M'Phail long ago, and, until the present time, their conjecture has been verified. We find, by a communication in the Hort. Trans., that Mr. Gunter, at his gardens at Earl's Court, tried steam as a substitute for tan, by introducing it into a vacuity in the bottom of the beds. His beds were formed of mould, and the plants planted out on them, the whole being supported on rafters, covered in some parts with brush-wood, and in others with perforated planks. The heat obtained from the steam was found sufficient, but what is rather singular, no vapour penetrated through the mould, which soon became so dry and burnt up, that even waterings repeated often were not sufficient to keep the mould in the beds in a state fit for vegetation. In the gardens of Count Zuboff, at Petersburg, steam has been applied to heat a large cistern of water, the whole size of the pit, which, when once heated, continued to give out its heat gradually and for a long time.

Steam-pipes have often been introduced into pits, and covered with fragments of stone, gravel, saw-dust, and coal-ashes, upon the surface of which the plants in pots were sometimes placed, and in other cases plunged into the latter materials; and in some cases, the cavity in which the pipes were placed was covered with perforated planks, for the ascent of the heat; but, in most of those instances, the success was far short of that of pines plunged in a bottom heat, produced either from tan, leaves, or dung. The refuse in the process of dressing flax has been used in many parts of Scotland, to produce a bottom heat, but the heat produced has been found too violent, and of short duration. Moss, (*Hypnum*,) has been suggested lately by Mr. Street; and, as its decomposition and fermentation proceed slowly and never violent, it is probable that it may be successfully used as a substitute for tan, leaves, &c.

Having so far entered into detail on the means of obtaining a sufficient degree of bottom heat, for the growth of these plants, we will now proceed to detail their general management throughout the year, in the three departments of nursing, succession, and fruiting pits or beds; and in so doing, we

will suppose the plants to be growing in beds of tan, leaves, dung, or a mixture of all, and when reference is made to the temperature, it is to be understood as applying to the scale of Fahrenheit's thermometer, as being in the most general use in gardens.

In addition to this, however, may be added that of Six's, and denominated Six's registering thermometer. It will be found useful as a check on the person, who has the charge of the fires, it being so constructed, as to indicate the extreme points to which the heat has fallen or risen in the course of the day or night; and for ascertaining the temperature at the roots, or in any part of the bed, we recommend the pine-bed thermometer, invented and manufactured by Mr. Bregazzi, price 1*l.* 12*s.* 6*d.*, which may be procured by means of any of the respectable London nurserymen.

NURSING PINE PLANTS.

The temperature of this department should now be kept up, as near as can be to 65°, mornings and evenings, and in sunshine, on good days, it may be permitted to rise to 70°. In whatever way this department be heated, whether by fire-heat, steam, dung, or tan and leaves in a state of fermentation, the same degree of temperature should be kept up, which can be readily done by any of those materials. The general management of the plants will be the same, in whatever way the temperature is kept up. Air should be freely admitted every good day, dividing the quantity so admitted regularly, that an equal circulation may be in all parts of the pit or frame. Whatever the state of the weather may be, it is necessary that the confined air be allowed to escape, which can be done by tilting up the ends of some of the sashes an inch or more at front, and a corresponding number being also opened at the back; the confined air being lighter, by reason of its being much warmer, will either rush out or be displaced by the pressure of the cold, and of course the heavier air, forcing in on the opposite side will in a few minutes charge the pit with a volume of fresh air,

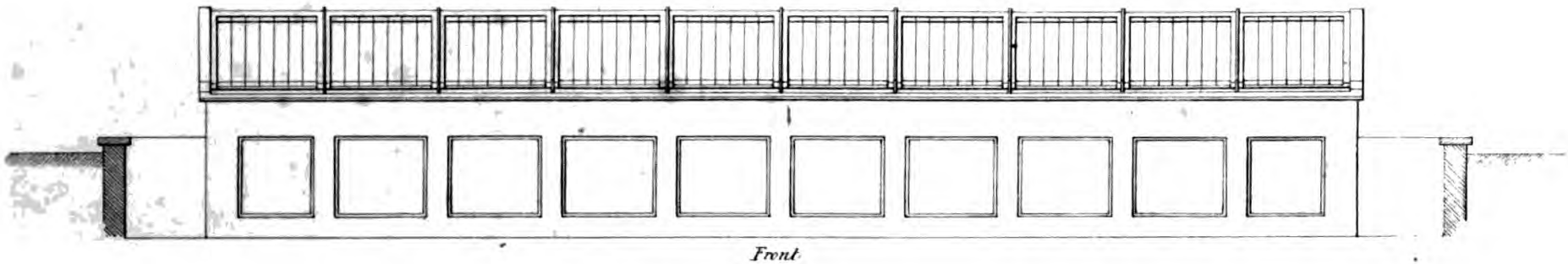
which will supply the plants till furnished with more by the same means, or till more favorable weather. Indeed, there is much more injury done to the plants, by being too long confined in a close unwholesome atmosphere, than by allowing fresh air into the bed, should it even lower the temperature 5° or 10°. Little water will be required at their roots at this season, once in twelve or fifteen days will be often enough, even where fire-heat is used. Still it will be necessary not to fix any precise time for watering, but to perform it accordingly as the plants may require it. Those which stand next the flues may require it oftener; and such as are strong and vigorous will require some water, while others that are not so luxuriant may thrive without any, even for a greater length of time. This is a matter of some importance, and therefore the plants should be examined, at least once a week, at this season, and only then, such as may really want it should be watered. It is better to give a little and often, than to deluge them at once, and leave them for a week or two without any water.

In watering pines during the winter, some of the best cultivators apply it from 80° to 85° of heat, and some much warmer. Water applied to their roots, or over the leaves, in a cold state, is evidently a bad practice; we should think a pretty good criterion might be fixed, by applying the water at, or a little above the temperature of the air of the house. Even in summer, water should be exposed to the influence of the sun for some time previously to its being used, or rendered mildly warm by the addition of a portion of water heated for the purpose. It is, perhaps, not going too far to suppose, that cold water applied to the roots, or over the leaves of plants, while exposed to a temperature of from 80 to 100 degrees of heat, produces effects somewhat analogous to persons drinking it while they are in a state of high perspiration.

Those pits, however, which are wholly heated by means of fermenting matter alone, will not require watering so often, as a considerable moisture will be supplied from the materials undergoing the process of fermentation. To promote a still

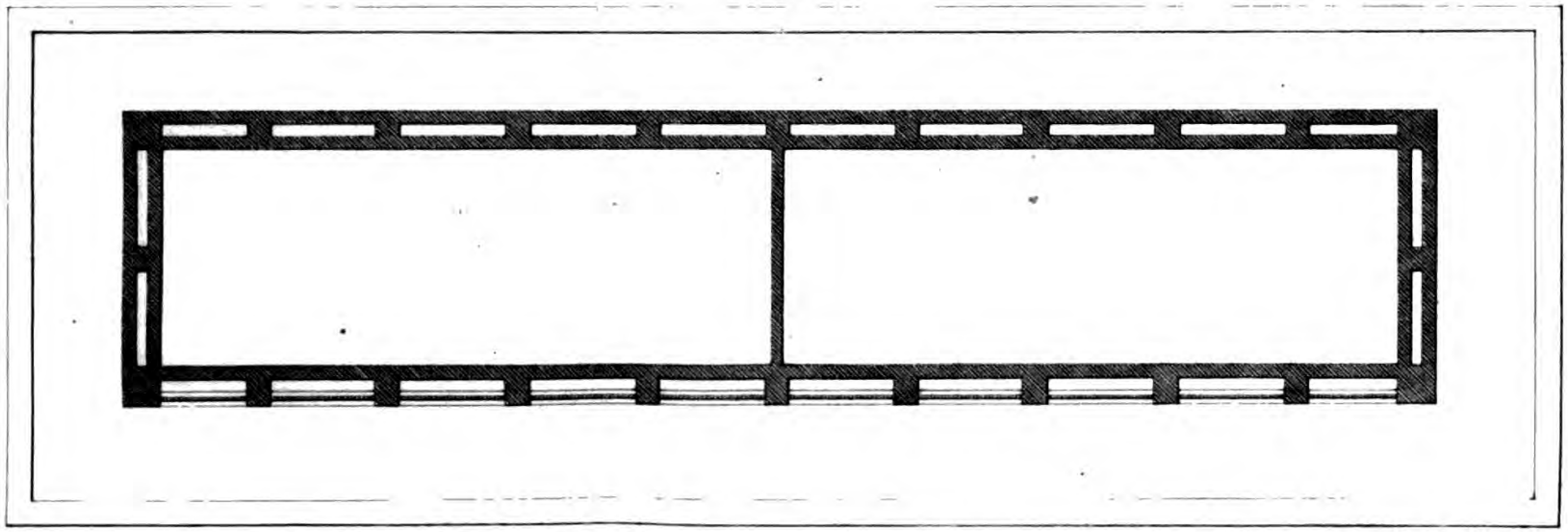
moister atmosphere in the pits or frames, they may, in fine days, be syringed all over with water brought to the temperature of the air of the pit or frame, but this should not be done in a careless manner, a little being sufficient at a time, and it is also of importance that it be regularly divided over the beds. In dull cloudy weather be more sparing of this mode of watering; but in clear frosty weather, when there is some sunshine, it may be given more largely. It is safer to give too little water at this season than too much, and it should be administered in the forenoon of such fine days as sometimes happen at this season. The operator need not open every light for this purpose, but syringe the whole from the middle; or, if the pit or frames be long, at equal distances from each end. While the watering is going on, a second person should hold a mat over the operator to prevent too much cold air from rushing into the pit. This watering over head is of much consequence, where the forcing is carried on by means of steam or fire-heat only, as, in such cases, the internal atmosphere of the pit or frames is generally too dry for any plant almost to live in; and were not the pine one of our hardiest exotics, and capable of living in such artificial climates, that almost no other fruit-bearing plant could exist in, more instances of failure would occur from this practice alone, than from all the other bad modes of cultivation combined.

Such crowns and suckers as have been taken off the fruit or plants late in autumn, and are not yet well rooted, will of course be kept at one end of the pit or frame, and can be supplied with much less water than such as have struck root, and will soon be beginning to make both fresh roots and leaves. The sashes should be covered up carefully every night, with mats or thick canvas covers, and over them some reed-mats should be placed, as being capable of throwing off the rain or melted snow, which the canvas, and more particularly the mats, would let pass through to the glass; and, if the sashes be not in excellent good order, would penetrate into the plants, which might be the cause of too much damp, besides chilling the atmosphere of the pit or frame too much. This covering should



Front

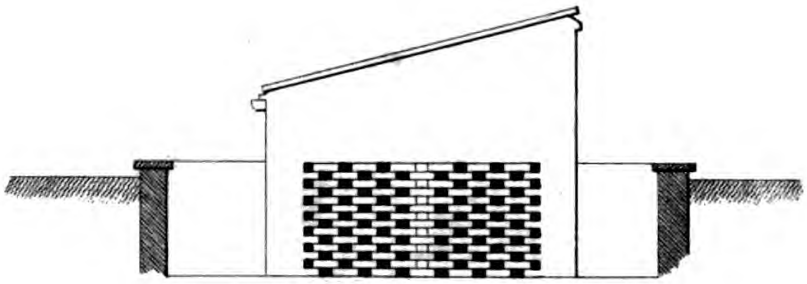
Plan



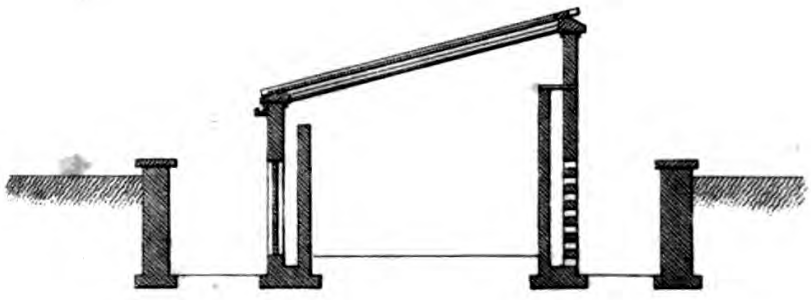
London. Published by Thomas Kelly Paternoster Row June 1 1820

Succession Pine Pit.

End Elevation.



Cross Section



London Published by Thomas Kelly, Paternoster Row, July 1, 1829.

be put on about sun-set in the evening, and removed by sun-rise in the morning, or soon after, and should never be kept on during the day, excepting in very severe weather indeed. Light and air at this season are the principal *natural* agents for keeping pines in health; and when either is withheld for any length of time, the plants will soon lose color, and assume a sickly appearance. Whatever way pine-pits or frames are heated, covering the sashes at night is certainly a great saving of fuel, where that article is expensive.

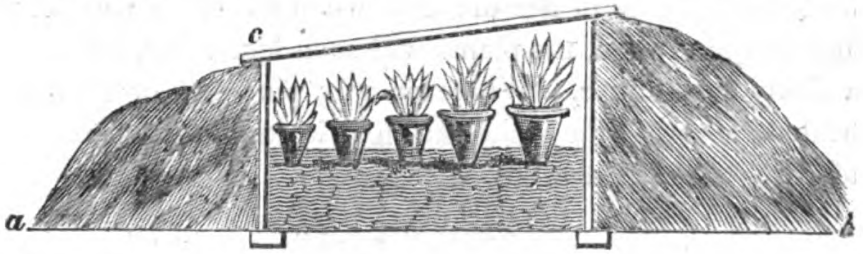
SUCCESSION PINE PLANTS.

The plants in the succession house or pit, should be managed much the same as the nursing-pit, already described. The temperature should be kept as near to 60° as possible, and should not be allowed to exceed 65°, as sudden transitions at this season would be apt to start the plants into fruit, which would be next to losing them altogether. Less heat should generally be allowed succession-plants, than even those in the nursing-pits, in order not to draw them; and during their continuance in the succession compartment, they should be allowed more room in the bed, and be frequently shifted, and abundantly supplied with air and water, in order to strengthen the heart or root part of the plant, that they may be able to throw up strong fruit. The admission of air may be regulated, as directed above for the nursing-pit, and water should be given in moderate quantities every ten or twelve days. The covering should be, in like manner, attended to mornings and evenings.

CONSTRUCTION OF SUCCESSION PINE-PITS.

As an example of an economical and useful succession pine-pit, we give that of Mr. Aiton, in the royal gardens at Kensington, which is the same as that of Baldwin, in which he has so successfully cultivated this fruit, and of which the accompanying figure will give an idea. In the Kensington gar-

den, the soil being damp, they are raised on a platform (*a b*), a little above the surface, to render them dry at bottom, which is a very necessary precaution. In front, they are provided with a gutter (*c*), which is of material consequence, by keeping



the lining in front dry, and thereby preventing the heat from being interrupted, or the bed suddenly chilled, during and after heavy rains. The plants are often fruited in these pits in the royal gardens, but, for the most part, they are removed into the fruiting-house, recommended in the last article. The best cultivators of the pine prefer to grow their plants in pits, in preference to the old practice of growing them in larger houses, or deep pits, heated in a great measure with fire-heat. Many varieties of pits for this purpose have been recommended, but we see nothing in them superior to the above, which combines all that is necessary, under good management, to grow this plant in the first degree of excellence.

FRUITING PINE-PLANTS.

The plants in the fruiting-pit will require to be treated the same as the succession-plants above. Keeping the temperature steadily at from 60° to 65°, as it will be more desirable for general purposes that the plants do not start into fruit till the middle or end of next month. Some sorts of pines are, however, found to swell tolerably well during the winter; such, therefore, as are in fruit, should be kept as deep in the bed as possible, so that their roots may enjoy a sufficient share of heat to forward the fruit at this time, when the general temperature of the house cannot be kept sufficiently high for them, without sacrificing the remainder of the plants, whose general crop of fruit it may be desirable to keep back to a later period

of the year; they should also be liberally supplied with water at their roots, and be frequently sprinkled over head with clear water, to refresh their leaves.

Most of the generally cultivated pines, however, are found not to succeed so well, if brought into fruit at so early a season. Where pines are cultivated upon an extensive scale, it is better to have separate fruiting-houses, and indeed succession-houses for the different sorts, that will swell their fruit in winter, and also for such as fruit at a more advanced season. Small houses, therefore, have this important advantage over large ones, that the crops, of whatever kinds they may be, can be brought into fruit in regular succession, which cannot be done so well in houses of more capacious dimensions, where the inhabitants require a very different treatment, particularly as regards temperature.

Thus, if a separate fruiting-house was appropriated to *Queens*, and some of their nearest associates, they might be fruited in nine months, or even twelve months, less time, than those that are generally by gardeners denominated black pines, which include the larger growing sorts, such as the *New Providence*, *Globe*, *Black Antigua*, and *Enville*, which require three or four years' cultivation, and upwards, to bring them to due perfection, and which, when grown to the amazing weight of ten or twelve pounds, may well deserve a separate house for their reception.

It not unfrequently happens that a quantity of water lodges in the hearts of pine-plants, either from the rain or melted snow finding its way through the sashes, in consequence of bad glazing, or not being in a proper state of repair, and often from the excess of watering over head, assisted also by the condensation of steam falling into them from the glass. When this is observed, particularly during winter and autumn, it should be drawn out by the syringe made for the purpose, and which can be purchased of any respectable nurseryman, or may be made by any ordinary intelligent tin-smith; or, in want of such an instrument, many cultivators use a small tin tube, one end of which they introduce between the leaves of the plants, and draw the water out by sucking it up with their mouths.

Fruit of the New Providence pine has been grown in the garden of W. Crawshay, Esq., Cyfartha Castle, Glamorganshire, of the following extraordinary weights; one twelve pounds fifteen ounces, one ten pounds eight ounces, one ten pounds, and two nine pounds each. In the same garden, twelve queen pines have been cut, weighing altogether thirty-five pounds.

FORCING VINES.

Hints have been made to have crops of grapes ripe in March, by beginning to force in August, but after much expense and trouble, this practice has seldom realized the expectations of its most sanguine advocates. The time of ripening is not always early in proportion to the time of beginning to force. When the course of forcing coincides nearly with the natural growing season, ripe grapes may be cut in less than five months; when short days compose a third part of the course, in less than six months; when the course includes full half of the winter, it will require seven months before we can calculate upon ripe fruit, and then it will be of an inferior quality. The best time to begin to force is the first of March, if the object be to obtain a good crop of well-flavored grapes moderately early. In proportion as the state of vegetation is put into action before that time, the natural habits of a deciduous plant, and the unfavorable state of the weather, will leave a great number of obstacles, and discouraging contingencies to retard final success.

Those who are ambitious to have early fruit, to answer the demands of the market or their employer, and who have several grape-houses, generally begin to force the earliest by the middle of December, and sometimes in November, and successively in other houses the first day of the year, the first day of February, and the first day of March. To go through the details of all these houses, would lead to frequent repetitions which might tend rather to confuse than otherwise, and therefore we will confine our observations to one department, and begin with the year to regulate the vinery, and have every thing in order for commencing forcing by the first of February.

About the beginning of this month, let the flues be properly cleaned out, and such repairs as may be necessary done to the houses; at the same time, let the walls, flues, &c. be well washed with water, and afterwards white-washed with hot lime or whitening; the wood-work and glass washed with soap and water, and the trellises and vines anointed with a mixture of soft soap, sulphur, and tobacco. The borders should be forked up, and the vines, supposing them to have been pruned in November or December, fastened to the trellises, in a neat and orderly manner. The surface of the border should be covered with a coat of rotten dung two or three inches thick, and well watered with the drainings of the dung-hill, sufficient to penetrate to the full depth of the border. This watering should be repeated occasionally during this month. The border on the outside should also be covered with five or six inches of good moist dung, if not done in autumn, which will be of much benefit to the vines, by protecting their roots from the effects of severe frosts, as well as contributing an additional supply of nourishment to them; and, indeed, this and the application of liquid manure, are the only means of supplying the necessary nourishment to them, as digging it in would be attended with serious consequences to their roots, however carefully the operation may be performed.

Some cultivators have recommended supplying the roots with liquid manure, by forming drains under the surface, and allowing it to escape from them into the borders; but when that "nectar of vegetation," as Nicol calls it, can be supplied by the simple process of pouring it upon the surface, or by spreading rich half-rotten dung upon it, as recommended above, we see little to be gained by such drains. The liquid manure, applied in itself, will find its way sufficiently deep into the borders, if supplied in a sufficient quantity, and the natural rains of winter will wash down sufficient nutriment from the dung, and should that be thought not sufficient, repeated waterings may be applied as an auxiliary.

The border should, as directed for the interior one, be carefully forked a few inches in depth, merely to render the surface more porous, and capable of admitting the juices of the dung, but care must be taken not to injure any of the

roots that may be near the surface. About the beginning of the month, or indeed as soon as the operations of cleaning and washing the house are commenced, the sashes should be put on (if they have been at all removed), and shut up every night, as well as during heavy rains or snows during the day, but a sufficient circulation of air should be admitted during the day, either by the lights or by means of ventilators, to keep the temperature nearly equal to that out of doors, till towards the third week in the month, when it may be allowed to exceed the external temperature a few degrees. During the third week, slight fires should be made throughout the day to dry the flues, and if they raise the temperature in the house, give sufficient air to keep it within due bounds.

If the vines be planted outside of the house, they should be protected by means of moss or hay-bands first wound round their stems, then covered with long littery dung or fern-fronds, secured from being blown about by a piece of old mat, or any such covering.

The stems of the vines inside the house, and their larger branches for some feet from the stem, should be covered with moss or soft hay wound round them, and watered frequently with a syringe, which will keep the stems moist, and will contribute to their breaking stronger, and the production of vigorous shoots. In cases of hard forcing this is particularly necessary, and should always be done to such vines as are planted in pine-houses, particularly such as are planted within the house.

The able conductor of the Gardeners' Magazine make the following excellent remarks upon Mr. Shephard's practice: "The vines have been in a state of continued pine-apple heat for thirty, and some for nearly forty years, and during the whole time bearing excellent crops. The sorts are chiefly the Black Hamburg and Sweetwater, with some Muscats. Mr. Shephard's general practise is to keep his pines at a very low temperature during autumn, and very high in the beginning of summer, the difference between which gives the vines a comparative winter; add to this, that they are chiefly trained over the back path, and that, by letting the sashes down during the greater part of the day in September, the leaves and shoots

are exposed to the direct influence of the weather. A sort of winter is, in some cases, produced, or at least prolonged, by training the shoots so closely under the roof glass as even to be in contact with it: that position being, in the winter season, the coldest in the house, owing to the radiation of heat from the exterior surface of the glass. Mr. S. strips the leaves off the vines every year, in the end of October or beginning of November, because, soon after the latter period, the sap begins to rise. In general, the Sweetwater vine so treated ripens its fruit about the beginning of April, and the Hamburg about a month later. The plants at the warmest end of the house, where the flues enter, in some cases ripen their fruit a month earlier than those at the cold end, and the vines in the succession-pineries are, of course, much later than those which are ripening their fruit. By this means, a succession of grapes is obtained from April to July. The stems of most of the plants are within the houses, in general in the back path, and the vines trained under the glass over that path; but sometimes they are planted in front, and trained under the rafters. In the latter case, the roots extend into a front border; in the former, they extend under the tan-pit, and into a border behind the back wall. The borders are never dug, but every year a coating of about a foot in thickness of half-rotten dung is spread over them, to keep out the frost in winter and the drought in summer, and to nourish the roots and encourage them to come to the surface."

We find our own opinion coincides with that of Mr. Acon, a very successful cultivator of the vine, in a communication to the Hort. Soc., the substance of which is as follows: the elastic powers of the wood are restored by a few weeks exposure to a cold atmosphere, which it never fails to lose when long confined in a warm dry one; exposure to frost promotes a disposition in them to break into bud much stronger and more uniform.

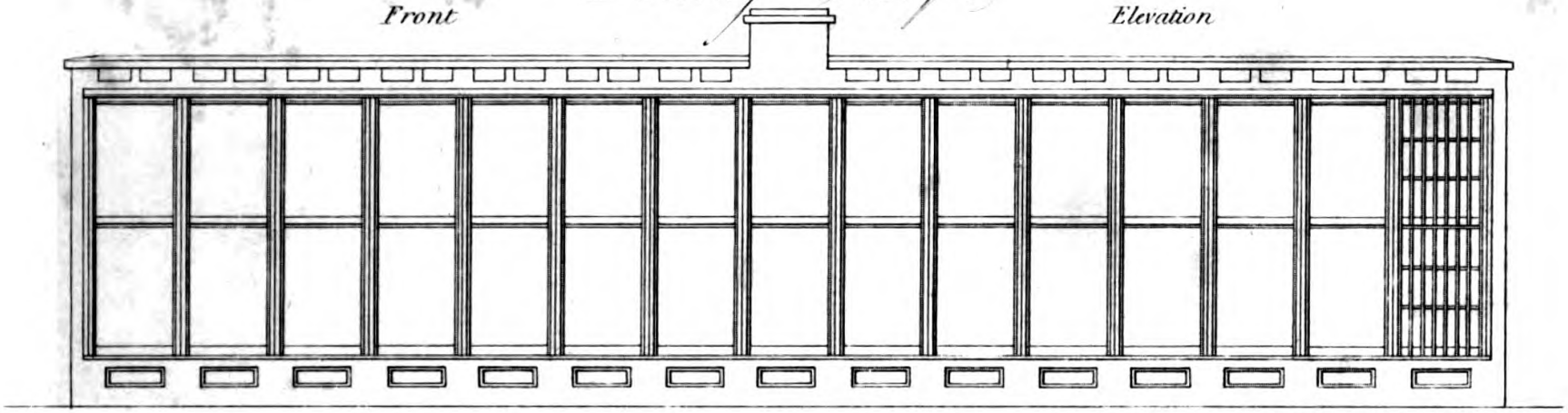
A supply of grapes throughout the year is a desirable matter, and has been often attempted with more or less success. In a communication in the Hort. Trans. by Mr. Acon, we find the following to be his practice: he arranges it so, that "the late house crop lasts from the middle of January to the end of

March; this is succeeded by the first crop in the early house which carries on the supply into May, and it is continued the grapes on the rafters in the same house, until the pin stoves, which are forced early in January and February, produce their crops. These keep in bearing through the summer, when a vinery, which I begin to force about the end of March furnishes the supply till the late house fruit is ready in January. This completes the succession." To effect this, he grows his early crops of grapes in a wide house with a flat roof, and plants the vines both on the back wall, and also on a trellis proceeding from the front parapet-wall to within as great a distance of the back wall as admits of a sufficient walk or passage between them. This trellis is at a considerable distance from the roof, and placed at an angle that casts the least shade on the back wall. The vines upon this trellis, and those on the back wall, are begun to be forced on the first of September, and by his process produces ripe grapes the first week in March, which last till May. Six weeks after the vines above are put into a state of vegetation, he introduces another set of vines from the front, and trains them up the rafters. These latter introduced vines produce their fruit early in May, and last till late in June. To prevent too much shade, only one shoot is allowed to each rafter, and throughout the whole system of pruning, no more wood is left than is sufficient to secure a crop, both in the late and early houses; and in the summer pruning, the fruit-bearing shoots are pinched off at the joint above the fruit.

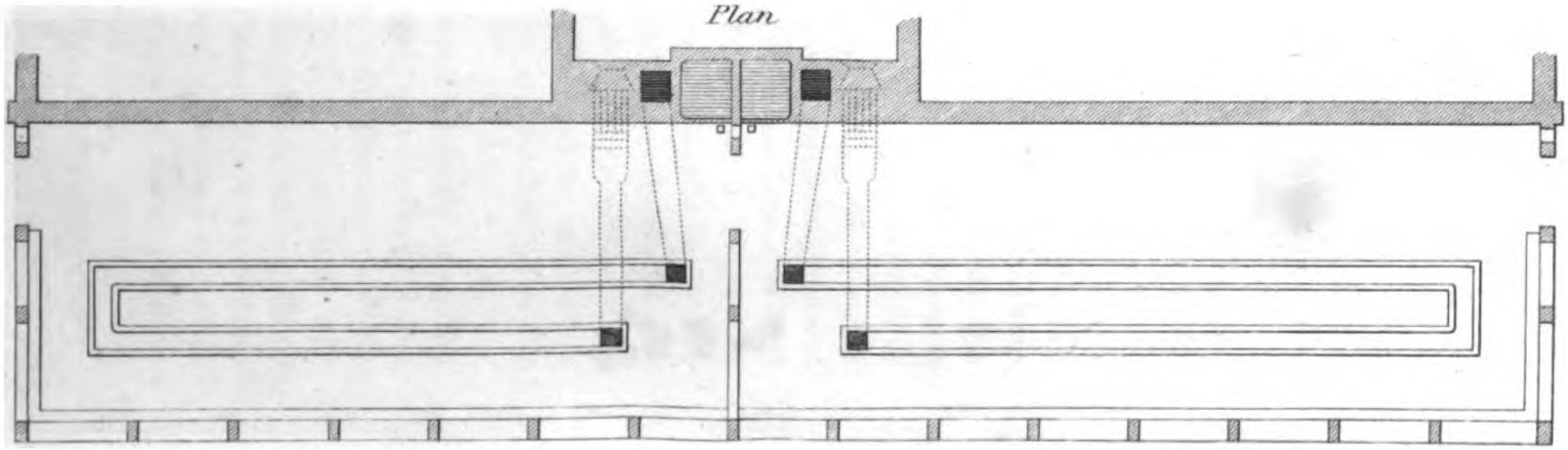
"When the crop is over, and the wood perfectly ripe, the branches should be laid near the ground, and shaded till the recommencement of the forcing. By this practice, they will be found to have accumulated excitability. The shade will have some affinity to the gloom of winter, which never fails to give vegetation increased energy. Plants which have been forced early will always have an inclination to bud at the accustomed time, whilst it is difficult to move those which have never been habituated to forward excitement, but the habit once induced will continue, and will enable the cultivator to procure fruit at any time."

Forcing Pinery

Front Elevation



Plan

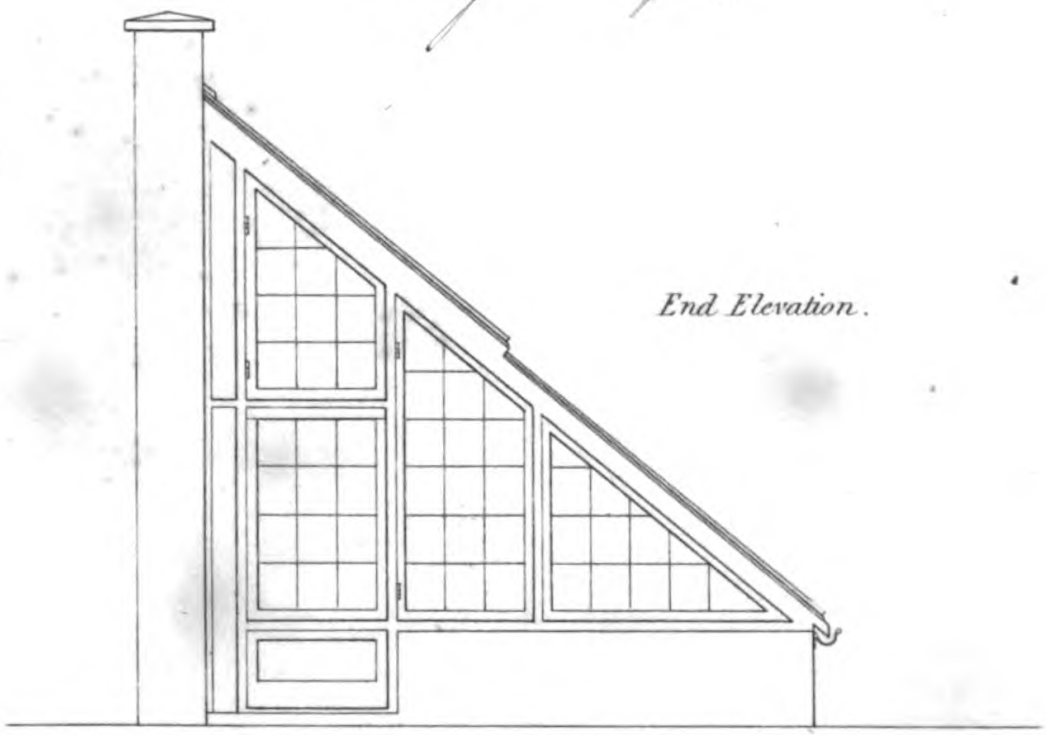


J. Douglas. del.

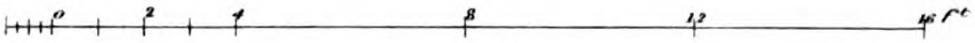
London Published by Thomas Kelly Paternoster Row Feb.y 1.st 1829.

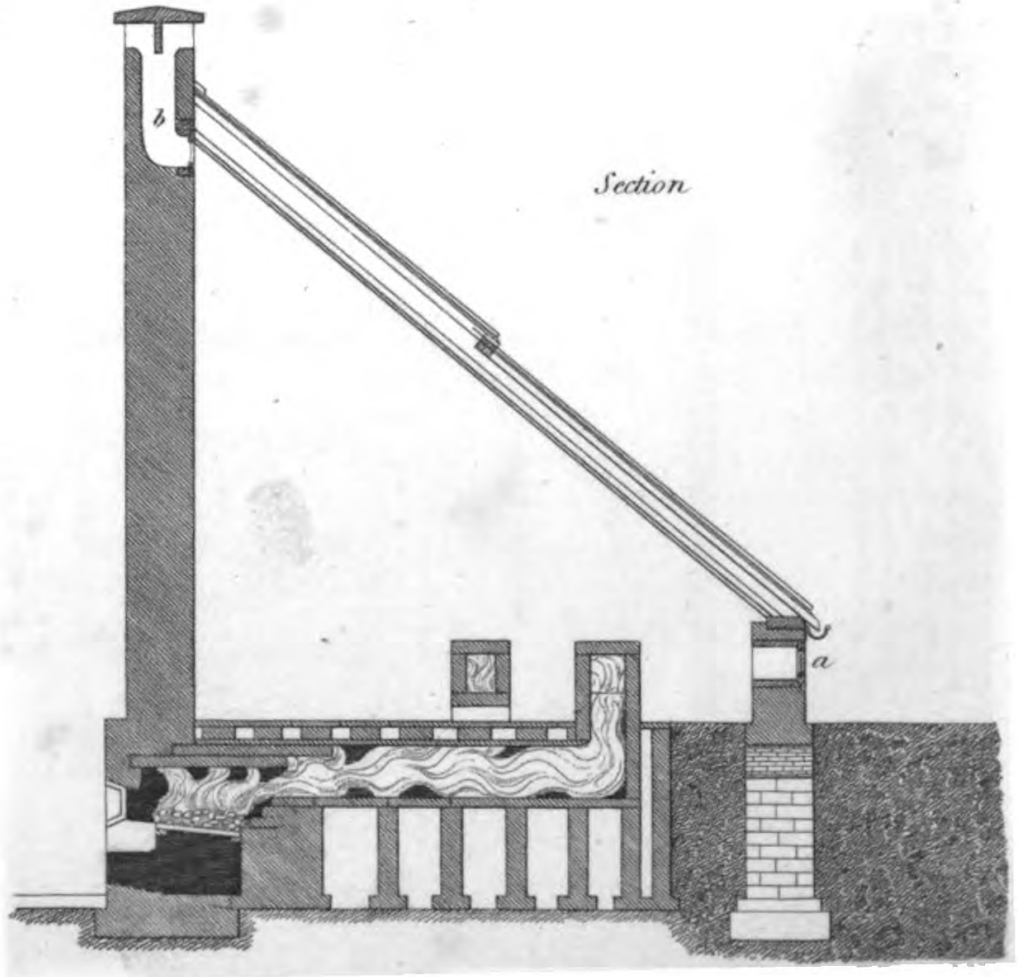
E. Turrell. sc

Forcing Pinery.



End Elevation.





Section

uglas. del.t London, Published by Thomas Kelly Paternoster Row. Jan.y 1.st 1829. L.Turrell sc.

The vinery in which he produces his late grapes is much narrower than that in which the early crops are produced, and having the roof also much steeper. The forcing, if we may so call it, in this house commences about the middle or end of May, by shutting up the house, and until the vines are out of blossom a warm temperature is kept up. "This," he justly observes, "is of more importance than is generally imagined. The wood which has to bring the future crop will be all made during this period. In a good heat it will be found to grow more compact, and to receive a form better calculated to produce and ripen fruit, under the cold atmosphere to which it is afterwards exposed. If the house be kept too cool at the beginning, the wood will be soft and long jointed, and therefore subsequently barren. Those who attempt to grow late grapes must pay serious attention to this circumstance, the failure of many may be attributed to the neglect of it."

The sorts of grapes preferred for this late forcing are the Black Damascus, St. Peter's, and Muscat of Alexandria, as they have the properties of continuing much longer in a perfect state after they are ripe, as well as their ripening better, after the sun becomes less powerful than any others. It is, however, necessary to complete the success of this late forcing, to have the berries perfectly coloured before the season is too far gone. A mild temperature being maintained during winter, these will be fit for cutting by the middle of January, and continue in perfection till those in the early forced houses come in, in March.

The vinery recommended by Mr. Atkinson for early forcing is now in very general use, and may safely be recommended as the most economical and rational of any. The accompanying plan, section, and elevation, will illustrate its principle. The roof sashes are fixed, and air admitted by the ventilators (A and B). These vineries have hitherto been heated by smoke-flues, but may be heated by hot water, the pipes and boiler to be placed where the furnace and flues are represented. In the accompanying plan, the furnace is placed in the sheds behind, and the flues entering the house under the floor level, proceed to within a reasonable distance of the front wall to admit of the vines being planted inside the house; they then rise above

the surface, and proceed to the further end of the house, where they make a turn, and return to that part of the house where they entered, and the smoke is discharged in the shaft at (C). The front wall is built on arches, which are within a few inches of the surface, to admit of the roots of the vines finding a free means of reaching the border outside the house. Such houses have been very generally recommended by that gentleman, and are, under different modifications, to be met with in many of the first gardens in the three kingdoms, and, where the cultivation has been judicious, the success in regard to crops has been complete. (*See Plate.*)

The distance at which vines should be planted, in forming a new vinery, is not easily determined, as much depends upon the kinds intended to be cultivated, the mode of training to be adopted, and other circumstances. It is, however, always better to plant too many than too few, as the cost of plants is trifling, and should any fail, or others turn out upon fruiting to be of sorts of minor value, the remedy is in cutting the least worthy out. We have observed already, that one vine of a good sort, such as the Black Hamburg, will soon completely fill a large house, and, under good management, produce as great a weight of well-flavored fruit, as any number of the same kind filling the same space; and when variety is less a consideration than quantity, this practice is not to be condemned. The most general mode of planting vineries, is to place one plant to each rafter, with a view to permanency. Many excellent gardeners, however, plant many more, both for variety and to suit the mode of pruning and training to be afterwards adopted by them. Amongst the latter, we can instance Mr. M'Arthur, F.H.S., gardener to A. Baring, Esq., who is one of the most successful cultivators of the vine, as well as one of the best gardeners in the country. The success of his mode of culture, we have often had the pleasure of witnessing, and can safely assert that we never saw finer crops produced. The vines in his houses are planted without any regard to distance, or number. By having many vines in one house, each has consequently a less number of bunches to produce, and may therefore be expected to produce them of greater size, both in the bunches and in the berries. But

we have, also, often observed vineries planted equally thick of plants, without producing crops of any merit. It therefore appears, that more depends upon the system of good management than upon the distance at which they should be planted, the mode of training, the form of the house, or any of the many points advocated by some of our theoretical horticulturists. In planting vines, some attention should be paid to the situation each should occupy in the house, according to the lateness or earliness of ripening of the kinds. Thus, if vines of early ripening be planted at that end of the house where the flues enter it, and later sorts at the end farthest from the fire, the season of grapes will be prolonged for a greater length of time; and if this order of arrangement be reversed, the crops will be more uniform in their order of ripening. Vines of delicate habits, such as the Frontignacs, should be planted by themselves, and not mixed with the more hardy and luxuriant-growing kinds, as in that case the former would be robbed of their share of nourishment by the latter; and probably a want of attention to this point may be the cause of so many complaints of the want of success in the cultivation of the finer kinds of grapes, when planted promiscuously among others. Some grapes require a greater degree of heat to ripen them in perfection than others, such therefore should be planted in pine-stoves, or in separate houses by themselves.

Speechly, in his "Treatise on the Vine," justly condemns the practice of planting all the different sorts of vines at the same distances, and recommends planting in proportion to the natural character and qualities of the kinds. Vines planted at three or four feet distant, he considers as crowded, and observes that, although by this mode a house will soon become furnished, yet in a few years time they become cramped for room, and are, consequently, rendered less productive. For those vines which have a space of twelve feet in height to grow, he recommends the more robust kinds to be allowed twelve feet distance at their roots, plant from plant, and the less luxuriant ones, a distance of six feet from each other. But, in order to fill the space to be covered with vines, he purposes to plant temporary plants, to be cut out as the permanent ones extend in growth. Such temporary plants he advises to be

grown to a good size in large pots, so as to come immediately into bearing, and to be so trained as to fill the upper part of the house or wall, while the permanent ones are filling the lower parts.

FORCING PEACHES.

Peaches are frequently begun to be forced in December and January, and become ripe in May. Little is gained by commencing sooner. But for a general crop, most gardeners prefer to begin by the first of February; and for this purpose, they begin to prepare the house during the month of January, supposing the trees to be healthy and fully established, and that they have not been pruned in November or December, when the vines were pruned. About the beginning of the month, let the flues be properly cleaned, and such repairs as may be necessary done to the house, the whole of them washed with water, and afterwards the walls and flues whitewashed with hot lime, to give the whole a neat and clean appearance.

Supposing the trees to be established, and their wood of moderate growth, neither luxuriantly strong nor yet too weak, they will of course be sufficiently ripened, having been forced the preceding year. If the shoots have been laid in a proper distance, and in a regular manner, during their summer training, they will require but little pruning at this time. First go over the whole of the trees, and examine what wood is worn out or nearly so, and if there be enough of young wood to fill up such spaces, then remove all or part of such branches as are exhausted. This should be done annually, so that it will not be requisite to cut out too much at once, as no tree is so impatient of severe pruning as the peach. Such shoots as are thus laid in to fill up the space occupied by the branches removed, should be shortened in, more or less, according to their strength, and the size of the space to be filled up, in order to cause them to break in such parts, and to push such a number of shoots as will fill the space intended as soon as possible. The summer shoots should be gone over, and a few of such as are near the bottom or middle of the tree shortened, or where there is a deficiency of proper wood, to cause a growth of young wood to supply any vacancies that may hereafter

occur in the tree; but such shoots as are short, stout, well-ripened, and nearly of an equal thickness, having a good wood-bud at their extremity, and a number of blossom-buds arranged along them, should not be shortened, but laid in at full length, for from these may be expected the finest fruit; and, indeed, in most cases, it would be useless to shorten them, as they seldom have wood-buds, except at their lower and higher extremities. Shortening, therefore, unless at a wood-bud near the bottom of the shoot, would destroy the whole; for if they be shortened any where but at a wood-bud, although the fruit might set, still it would come to nothing, in consequence of the want of a terminating shoot to draw nourishment for its support.

We are informed by Mr. Patrick Neil, in Hort. Tran., that M. Du Petit-Thouars, an eminent French physiologist and peach-cultivator, has drawn conclusions considerably at variance from this received opinion. "He denies the propriety of the distinction usually made of wood-buds and flower-buds; but states, that in the peach-tree for example, each leaf produces a bud at its *axilla* or base; this bud soon becomes triple, the two outer proving flower-buds, and the middle one a leaf or wood-bud. When this central bud happens to be favorably placed, it sometimes developes itself indefinitely, and produces the anomaly of a *gourmand* or robber. He has also announced that the embryo-flowers of peaches, apricots, pears, and apples, are palpably formed as early as midsummer of the year preceding that in which they are unfolded, and produce fruit. He asserts, that the branches of a mature tree produce regularly every season an equal average quantity of embryo flower-buds, and that if these fail to be duly developed, it must be owing to the low temperature to which they are subsequently exposed during the winter, or early in the following spring." If he be correct in these observations, the affording protection to such fruit-trees in the early spring months, acquires additional importance, and furnishes one of the best reasons yet given for protecting such as are in peach-houses, by allowing the sashes to remain permanently on them, as recommended by Mr. Atkinson.

Towards the extremities of the trees, provided that they have not yet filled their respective places upon the wall or trellis, most of the shoots, particularly the strongest, should be shortened, in order to cause them to push out shoots to fill the space, as they proceed. If this be not attended to, the shoots will extend themselves to a great length, and become naked and useless. All parts of the trees that appear too crowded with shoots, should be regularly thinned out, and the whole tree as it were balanced, or regularly supplied, with young wood from bottom to top, which, from the nature of the tree, will readily be accomplished, if sufficient attention be paid to a judicious mode of pruning.

The pruning being finished, let the whole of the trees and trellises be washed or anointed with the mixture, as directed for vines, and this should be done carefully, for fear of destroying the buds, which will now be much swollen. Lay the young shoots flat in one hand, while with the other gently draw a piece of sponge, dipped in the liquor, upwards (*but not downwards*), or the reverse way of the buds, two or three times, so that all filth may be washed off, and a good portion of the composition made to remain on the trees. The older shoots should be well scrubbed, upwards and downwards, to remove all filth, and the rubbing continued until the bark of the tree is well charged with the composition; indeed, the larger branches should be frequently anointed, before the blossom begins to expand, to soften their outward bark, and leave a greasy appearance upon them. Tincture of Digitalis, diluted in water, in the proportion of one ounce of the former to three pints of the latter, has been recommended for the destruction of the green-fly upon peach-trees; the application is made by sprinkling the liquid on the leaves or branches infested; and in many cases this is more conveniently applied than fumigation with tobacco-smoke. If the trees have any appearance of mildew, it should be now carefully attended to. The points of the shoots should be examined, where the mildew is only at this season likely to be discovered, and if it can be done without injuring the form of the tree, or removing shoots that can ill be spared, the infected shoots should be removed

as far down as the disease appears. However, if the shoots cannot be conveniently spared in course of the pruning, anoint such as are infected with a thick coat of sulphur, made into a paint-like substance by soap and water. This will soon eradicate it, if it has not become constitutional, or does not arise from an improper soil; in such cases, the border must be entirely renewed, and if the trees be much exhausted, they also must be removed and fresh ones planted, which may be taken either young from the nursery, or established from some of the walls in the garden, and carefully removed into the house; but where such is the case, it will be advisable not to force the house early, or if it cannot be avoided, allow few fruit to form upon such trees as are thus brought in. This will enable them to make wood sufficiently strong to secure a plentiful crop the following year.

The pruning and anointing being finished, let the whole be neatly tied to the trellis, about six or nine inches apart, according to their strength, with neat pieces of matting, well twisted, and moistened in water to add to their toughness. The larger branches should be arranged first, and the smaller ones laid in between them in regular order, observing, in tying the shoots to the trellises, to allow plenty of room for the shoots to swell. A general rule is to allow as much as would admit another shoot of equal size along with the one tied in. This being accomplished, fork over the borders of the house carefully, so as not to injure the roots of the trees, and give the whole floor of the house a good watering or two with liquid manure, either prepared for the purpose, or collected where it drains from the dunghill, sufficient to penetrate to the bottom of the border. The border outside the house, as far as the roots may be supposed to have extended, should also be forked up a few inches deep, in order to allow the rains to wash down the juices of the dung, with which the border should be covered to the thickness of three or four inches; this dung should not be too much exhausted, but be pretty good, in order to manure the roots. Although we do not approve of highly manuring the borders of peach-trees upon the open walls, still we think it necessary to feed such as are artificially forced with more strong food. Peaches do

not naturally grow under glass, and therefore should be artificially planted, pruned, and fed. It is a very common practice to dig in a quantity of rotten dung into the borders of peach and grape-houses; we have, however, always used liquid manure, and consider it preferable, as it can be applied without injuring the roots of the trees, and answers all the purposes of manure in any other form equally well, if not better. Towards the second week of the month, the house should be covered in, that is, the glasses put on, and the house sufficiently ventilated during the day, to keep the temperature nearly equal to the external air, covering up every night and always throughout the day, when there is any danger of heavy rains or snow. If the sashes be put on before the foregoing operations of pruning and dressing commences, the whole may be done more comfortably, and in that case, the rains or snow will not wash off either the composition put upon the trees, nor wet the flues, which should now be kept as dry as possible.

FORCING PEACHES IN POTS OR BOXES.

Peaches and nectarines are well calculated to force in pots or boxes, which should be large enough to contain at least one cubic foot of mould, and constructed like those recommended for cherries. The soil should be both much lighter and richer for plants in boxes or pots, than that recommended for the peach and nectarine borders, and liquid manure should be abundantly supplied to make up, in some measure, for the confinement of their roots. When established for one season in tubs or pots, they are then fit for being brought into the houses for forcing, and if managed as directed for cherries, plums, &c., will answer every expectation. The plants should be first placed in a temperature equal to that of the greenhouse, and afterwards removed into the peach-house or vinery, when the fruit is set. They will require copious supplies of water at their roots, and the surface of the mould in the pots should be covered with rotten dung, still more to exclude the action of air upon their roots, and if the tubs or pots be covered with ropes made of moss or hay, and kept somewhat moist, the success will be greater. Trees thus cultivated are

sometimes trained to small fan-trellises fixed to the pots, but they answer and look much better when trained as dwarf-standards, in which form peach-trees always ripen their fruit much better than by any mode of training practised. When the fruit is nearly ripe, they may be removed to the green-house or conservatory, where they will have a good effect, if arranged amongst the exotic plants in either compartment. Sometimes they are slightly forced, and removed into the open air, where they should be partially shaded from the sun for the first eight or ten days, and then placed in the flower-garden or some sheltered spot till they fully ripen. In this way the fruit becomes extremely high-flavored, and of a beautiful color. Occasionally, in very warm seasons, the peach and nectarine-trees thus treated, if forced very early and plunged out into the open air, will produce a second crop in autumn, similar to strawberries or cherries, which have been early forced; but in this case, the trees seldom recover from the effects of the experiment, which can only be considered as a matter of curiosity, and not utility. Fruits thus ripened, in handsome ornamental pots, vases, or neat architectural boxes, are often placed upon the table, with their ripe fruit upon them, where every one can help himself; in this way they have an agreeable and curious effect.

FORCING CHERRIES.

Of all fruits accelerated by artificial means, none are so difficult to obtain as cherries, they being apt to shed their blossom without setting their fruit. This is sometimes owing to imperfection in the parts of fructification, which we often find to be the case also with trees in the open air. The most successful forcers of cherries agree in giving as much air as possible, and regulating it as nearly as possible to the state of the atmosphere at the time the trees are in blossom, and until the fruit be set; thus giving strength to those parts naturally debilitated, and which would be rendered more so if confined in a close atmosphere.

The sorts most generally preferred for forcing are the May-duke, and sometimes the Morella. This latter sort is much

improved by being forced, and generally is a better bearer than any of those which produce their fruit upon artificial spurs; and from the natural character of this tree, (it bearing its fruit upon the young wood of last year's growth,) it is capable of a mode of training more suitable to the confined space of a forcing-house than any other.

Cherries are sometimes planted permanently in a house, and trained to trellises, and often as standards planted in rows in the middle of the house; planting the tallest plants at the back, and the dwarfest next the front: others plant trained trees, which are trained upon a trellis against the back wall of the house, and plant the front border with dwarf-standards. In either case, where the trees are to remain permanently, it is necessary to procure such as are healthy, and of sufficient height to suit the size of the house. Trees that are two or three years from the bud are to be preferred. We would, however, recommend that the cherry-house be furnished with plants grown in portable tubs, pots, or boxes, and that the trees be preparing for that purpose a year or two before forcing. They should be selected young in the nursery, but where there are many of these trees to be forced annually, we would recommend every gardener to propagate his own. When these trees are one year from the bud, they should be taken carefully up, and potted in pots of twelve or fourteen inches in diameter at top, according to their roots and strength of the tree, or in tubs of the same dimensions, either round or square, and if so, to be made upon the principle of our orange-tree box, (for a figure and description, see *Green-house* and *Conservatory*), so that they can be taken to pieces more conveniently, and the trees taken out without injury. After they are planted, either in pots or tubs, let them be plunged in a sheltered but not shaded quarter of the garden, and regularly supplied with water during summer, and the surface covered with rotten dung, both to prevent a too rapid evaporation, as well as to nourish the trees. They should remain there until the season of forcing, which for cherries is soon enough, to expect much return, about the first of January. Such a number should then be carefully taken up, and carried into the house, as may be either sufficient for the supply required, or to fill the house.

But as figs, gooseberries, currants, raspberries, apricots, and plums, may also be introduced into the same house, a portion therefore only of the cherries may be taken in at once. They should be regularly placed in rows upon the floor of the house, which if formed of rich good loam, and forked up, so much the better, to allow the roots to penetrate through the holes in the bottom of the pots or tubs, which they most probably have done already while plunged in the open air. If such be the case, care must be taken in removing them, so as to injure those roots as little as possible. They will strike root into the floor of the house, and will derive a considerable share of nourishment therefrom. To facilitate this, the egress of the roots, the bottoms of the tubs or pots should be perforated with many holes, proportionably to their size, and in planting them not over drained, preferring, instead of broken pieces of pots, pieces of fresh turf, which will admit of a sufficient degree of filtration, and at the same time not impede the roots in their progress through the holes. Such as are intended to remain for more than one season preparing in the tubs, should be taken up any time before the beginning of the spring, subsequently to their pruning, and such roots as may have penetrated through into the natural soil cut carefully off. This will not injure the growth of the trees, but rather throw them into a state of greater fruitfulness. When such a number of trees as may be deemed sufficient are placed in the cherry-house, draw a little of the mould of the floor of the house round them, or plunge them less or more into the border, but not too deep; stir up the surface of the mould in the boxes or pots, and if no roots appear near the surface, remove a portion of it, and supply it with some rich light hazelly loam, and mulch each tub or pot with an inch or two of rotten dung, which should be frequently replaced.

The number of trees to be kept in a state of preparation should not be less than one hundred, and accordingly as any number are removed into the house for forcing, let a like number be added to the stock, so as always to keep up a sufficient supply. This number need not always be young trees; many of those which have been forced one season, will, if taken out of the tubs or boxes and headed down, if in a weak

state, their roots dressed, and planted out in a quarter of rich light hazelly loam, be, in the course of one year or two at most, fit for re-potting; and others, when the forcing has not been very early, will be in a good state to force for two or more years successively; but such as do not break freely and show symptoms of vigor, should be thrown away. The same rule which regards cherries, is also applicable to apricots and plums. It is not worth while to keep gooseberries, currants, and raspberries, after they have borne one crop in the cherry-house; they may be planted out in any part of the garden where they may be wanted to fill up vacancies, or thrown away altogether, as they are so readily propagated, and while young, are much better suited for forcing, than when old. In arranging the whole in the house, the cherries, plums, and apricots require the most light and air, therefore that point should be attended to in their arrangement. The raspberries and currants will grow well in a little shade; and the gooseberries, from their dwarf habit, may occupy the front line, and thus take up little space, and cause no shade. The raspberries may be placed near the back of the house, between the pots or tubs of the other trees, and the currants occupy the middle, so as to be partially under the shade of the larger trees, but not too much to endanger the setting of their fruit. These trees are all to be understood as pruned before brought into the forcing-house, upon the principles laid down for trees in the open air.

Supposing the house now to be in readiness for forcing about the first of the month, proceed by making fires so moderate for the first ten or twelve days, that the thermometer shall not exceed 50°, and kept to that temperature throughout the day, by admitting a plentiful supply of air; after that time, increase the temperature gradually to 55°, at which keep it, as near as possible, during the remainder of the month. If there be much sunshine, it may be now allowed to rise as high as 60° or 65°, but upon no account allow it to pass that temperature. Large portions of air should be admitted to bring on vegetation regularly, on which depends, in a great measure, the success of the crop. In forcing any of the fruits under consideration, there is much less danger in having the temperature low than

otherwise. It should be an object of the forcing-gardener at all times to allow a few degrees of rise during sunshine, and towards the afternoon of each day; then to throw open the lights of the hot-house, to keep the temperature throughout the day equal or below that of the night; yet the following is too generally the case: fires are kept up during night, and the heated air confined so as to exceed the temperature throughout the day, whereas the reverse ought to be the case. The nearer we approach to nature in the regulation of most artificial temperatures, the more likely are we to be successful.

Plentiful supplies of water should be given to the plants, particularly over head, with the garden syringe, and the house should be steamed every night, by pouring water upon the flues, or by other means, so as to keep up a moist temperature, which will greatly promote the swelling and breaking of the buds. As the trees begin to break into wood, they should be supplied with portions of liquid manure to their roots; there is no method of manuring plants in pots so convenient nor so effectual.

Where a regular cherry-house is wanting, we would recommend a simple structure for the forcing of cherries, apricots, plums, and figs. Supposing, as has been directed already in planting fruit-trees against walls, that the different sorts of fruits have been planted by themselves, we would select a portion of a southern wall, already furnished with trees in a full-bearing state, of the sorts wished to be forced, and against one or more trees, erect a portable-house or glass-case, which if the walls be furnished with flues, or built hollow, can be heated sufficiently; or if they have not been so built, then a temporary flue may be introduced through the wall from a furnace behind, and carried along the surface of the border within the house, elevated a few inches above the surface, and made to pass through the wall again, and the smoke carried off by means of an upright flue carried up behind, and equal to the height of the wall. The rafters which support the sashes should be fixed to the top of the wall by means of screw bolts, which may remain fixed in the wall, and made to pass through the end of each rafter, with a nut to keep them secure; these rafters need not be heavy, as the weight of the sashes will

chiefly rest upon the wall-plate, which will be supported upon blocks or piles driven into the ground at equal distances, say one under every other rafter, and the space between the surface of the ground, and such wall-plate to be boarded closely with well-seasoned inch deal; which deals should be fixed to the piles, by means of screws so constructed as to be readily taken out, to allow the whole to be taken to pieces when not in use. The height of this boarding may be from one to two feet, which will elevate the sashes so as to be opposite the best part of the wall, as well as to admit of their being occasionally taken down to admit air. Should the sashes not be of sufficient length to reach from this plate to the top of the wall, a part of the top of the rafters may be covered with seasoned boarding, similar to the front; but, in the case of this upper boarding, it will be necessary to place the boards in an imbricated manner, to preclude the rain from getting in. The sashes need not be more than three or four feet distant from the wall at bottom, as all that is necessary to be done to the trees can be done by a careful person inside, or from the outside in fine weather. The materials with which such a frame as this is composed should be got up in a neat and portable manner. The angles at the ends need not be glass, they should be boarded up, and at one end a small door for the admission of air, as well as for examining the trees, state of temperature, &c. Several of such frames as this, or where better can be devised, will be extremely useful in every garden, and the sashes may, when not in use for such purposes, be employed in ripening melons, cucumbers, &c.; and in autumn such frames will be of much use in accelerating the ripening of late peaches, grapes, &c., upon the walls, and for preserving grapes, that may have ripened, for a great length of time. The many useful purposes for which portable structures or glass-cases may be used are not yet sufficiently appreciated, we expect to see the time when they will be found in every garden.

In glass-cases, similar to these, cherries have been successfully forced by Mr. Torbron, one of the best practical forcing-gardeners of the present day. The temperature and general management of the trees in them will be exactly such as is already laid down, only, if it be necessary to introduce the

heat by means of flues built upon the surface of the border within the frame, the border should be covered with rotten dung two or three inches thick, and be carefully supplied with water, to keep it in a proper state of moisture; and the border in front of the glass-case should also be covered with rotten dung, and occasionally watered, but this watering of the external border will depend upon the state of the weather: care must be taken not to be too profuse of water until the fruit be fairly set, as it is apt to drop; indeed, we are never sure of a crop of cherries until the stones are formed in the fruit. If a case, such as this, be placed over a space of wall occupied with plums, and another over a space occupied with apricots, and another of figs, we may expect, under ordinary good management, a plentiful crop of all these delicate fruits at an early season, and at much less expense, than by any other means whatsoever. The same trees may or may not be forced the succeeding year; if they be allowed a year to rest, their future crops will be benefited; but if forced every year will become habituated to the change of season as it were, and will, under ordinary good management, continue fit for forcing for several years. Since the beneficial effects of heating by hot water, as recommended by W. Atkinson, Esq., have been acknowledged, portable structures may be readily heated, by a complete set of portable hot-water apparatus, which may be removed annually at no great expense, and applied to heat that part of the wall intended to be forced; and for forcing cherries we would say, that it is the best mode of heating that can be applied, from its giving out its heat more gradually, and the almost impossibility of over-heating the air of the structure.

The following remarks are from the practice of Mr. Flintelmann, gardener to the King of Prussia, upon forcing cherries. The Double May is the sort chosen, and is grafted upon the common wild-cherry of the woods. They are planted in good garden-mould, with a mixture of vegetable mould, and are one year establishing previous to being forced. During this time they are placed in a sheltered situation, and fully exposed to the sun; during winter their roots are protected from frosts by being covered with litter.

The following interesting mode of treatment is practised, for the purpose of inducing in the trees a disposition to form blossom-buds. The spring subsequent to their being planted, the blossom-buds are taken off as they appear, and by the end of June, or beginning of July, such shoots as have formed have their points taken off, leaving not more than six buds; these buds, by this practice, become all blossom-buds.

The exposing them to a degree of cold, previous to their being taken in to force, equal to fourteen degrees is considered a leading feature in this practice, as well as thinning out the flower-buds to a very considerable extent, often to three-fifths of their whole number. We may here observe, that the thinning of the blossom-buds is much too little attended to by English forcing-gardeners, and it is not going too far to say, that those upon the open walls should also be considerably thinned. In the Prussian royal gardens, the temperature commences at or about 46 degrees, and during their growth, the trees are frequently sprinkled with water, rendered moderately warm. The roots also are watered with warm water, of a temperature equal to that of water when boiled, mixed with an equal quantity of cold. As soon as the plants are placed in the cherry-house, they are well soaked with this water, which watering is continued till within fourteen days of their coming into bloom. The roots, previous to their being brought into the forcing-house, are kept perfectly dry for some time. When the trees are coming into blossom, the watering over head is suspended, but the stems and principal branches are kept moist by rubbing them two or three times a-day with a wet brush. While the trees are in blossom, the temperature is gradually raised to 67 degrees. Air is freely admitted, and during bright sunshine, the houses are shaded. In admitting air during cold and windy weather, pieces of gauze are placed over the parts opened, to break the keenness of the air. The temperature of the house is kept steadily between 54½ and 65¼ degrees, from the time the fruit sets until it has considerably swelled previous to stoning; but while stoning, it is lowered to 59 degrees for two or three weeks during this crisis. Shading is particularly attended to during sunshine, a practice that

would be rather novel in this country, but probably done from a view to lengthen the period of the flowers remaining in perfection, and thus giving a greater chance for the office of impregnation being performed, which we suspect is not sufficiently attended to with us, particularly in the early forcing of stone fruits. We have often observed, that when very hot days occurred while the cherry-trees are in blossom, even on the open walls, that the blossom soon fell and a light crop followed, and this too in a particular degree, when the cherry-trees were unusually covered with bloom. These two points are leading features in Mr. Flintelmann's practice, namely, thinning the blossom-buds, and shading during their expanded state, both of which undoubtedly tend to give additional strength to the parts of fructification of those flowers, which are left. During the period that the fruit begins to swell after stoning, till they are ripe, the temperature is raised to 65 degrees, and during this period, both air and sunshine are freely admitted, to color and flavor the fruit. The same intelligent foreigner has successfully used rotten saw-dust, or chopped moss, to which he adds some unburnt lime pounded, as a preparation in which to plant his trees intended for forcing. Saw-dust we are not aware has ever been used in this country as a matter in which to plant fruit-bearing trees, neither has it, as far as we know, even entered into compositions for that purpose, being considered chemically as mere woody fibre; little good has been expected from it as a manure, or affording food for plants.

Moss has been brought into notice by Mr. Street, in a communication to the Hort. Soc. and Gard. Mag., as "possessing a power to some extent of regulating temperature, more than most kinds of earth; that is, it resists extreme heat and extreme cold, and is not apt to lose all moisture suddenly, while it discharges a superfluity of moisture. It does not act like some rich earths, giving out all its virtues at first, but becomes gradually richer in decay, when a fresh supply may be added in the same space of pot room." Those interested in this curious experiment should consult the analysis of woody fibre by Gay Lussac and Thenard.

FORCING FIGS.

Few houses are built expressly for forcing this fruit. They are generally forced in the cherry-house, or planted upon the back walls of vineries or peach-houses, and trained in the fan manner to the wall, or more generally to a trellis; but as figs, under all circumstances, thrive better as standards than otherwise, they are also found to succeed better as such in forcing-houses, and to succeed pretty well if planted in the middle of vineries, as dwarf-standards, under the shade of the vines, and in this case often ripen both their spring and autumn crops. We would consider it the most eligible method to have them in boxes, or large pots, as by this means, they could be removed at pleasure to the most convenient situations in the houses. But where there is the convenience of a cherry-house, it will answer equally well for both plums and figs, and a house of ordinary dimensions will, under good management, afford enough of all these fruits for a large family.

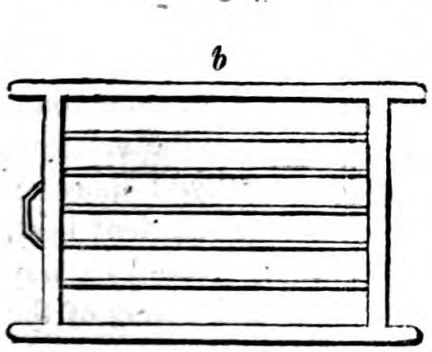
Figs, in whatever situation, are very subject to be attacked with the red spider. Care must be taken to use the garden-engine, or Reid's syringe, with force upon the foliage, and when the fruit begins to ripen, as it would be detrimental to the flavor of the figs to be much watered, recourse must be then had to a painter's brush, with which to brush the leaves, but this must be carefully done, as the leaves of the fig, like those of the vine and melon, are extremely delicate in their young state, upon which the spider is most likely to commit its ravages. When the leaves become older, and of course more robust, less care is necessary. Few other insects annoy the fig, except the coccus or scaly insect, which will do little injury to the trees, and may be rubbed off with the finger, or left on till the fall of the leaves, and then washed off with soap and water. The red spider may also be suppressed by sprinkling the flues, when they are pretty hot, with flour of brimstone, or a little of it may be sprinkled on the leaves with good effect.

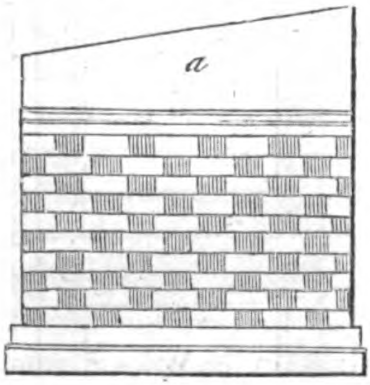
FORCING CUCUMBERS AND MELONS.

The production of these fruits at an early season of the year is an object of considerable emulation amongst gardeners, and

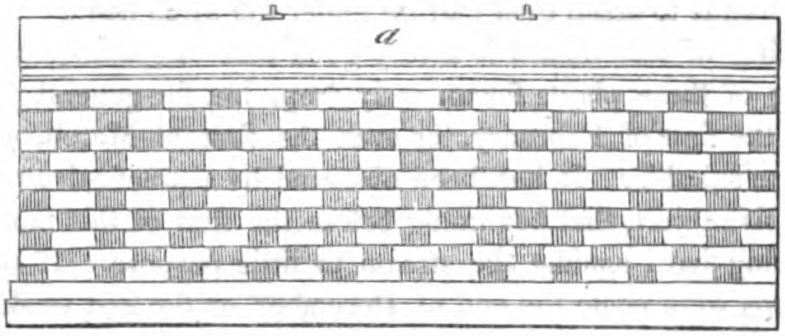
many contrive to cultivate the former of them all the year round. As their general management is so nearly alike, we will continue to detail their culture under the same head. The beginning of this month is a very good time to commence the rearing of these plants for an early crop, but for general purposes, the first of February, or even the first of March, will be more suitable. It has been observed by a practical writer upon this subject, that beginning before the first of this month is striving hard against the stream to little purpose. If preparations were made the end of December, or the first week in January, so as to sow the seeds by the second or third week in the month, the success will be generally greater than by sowing a month, or even six weeks earlier. But when cucumbers are particularly wanted by a family during all the winter months, then it is much better to cultivate them in large pots or boxes in the pine-stove, or else in a separate department, in which French beans, strawberries, &c., may also be grown with tolerable success during the whole of the winter; but under common frames or pits, heated only by means of fermenting dung, the chance of success will be precarious. Cucumbers and melons are forced in a variety of ways; some gardeners preferring common hot-beds, others dung-pits in their different modifications, and not a few have of late years grown them in pits heated by steam.

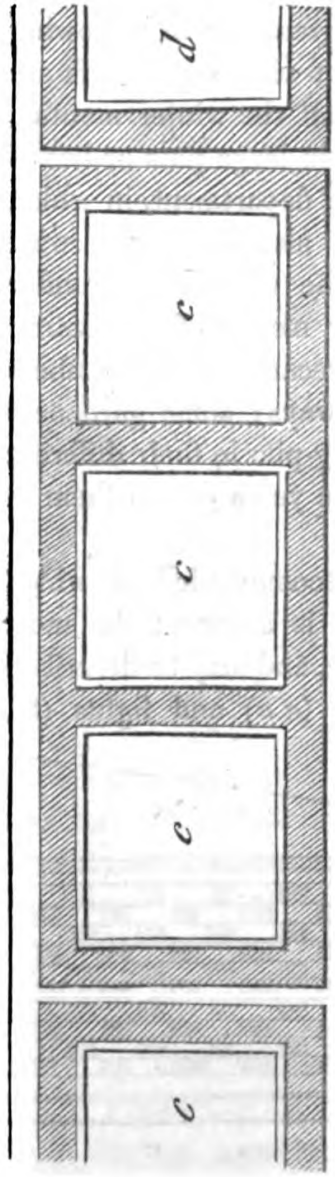
Many varieties of pits have been recommended in which to grow these plants, that of M'Phail is amongst the most ancient, and has been in very general use, and may be described as consisting of two parts; the frame (*a a*) and lights (*b*),





which are of wood, and differing nothing from those in common use for growing these fruits; in the second part is the

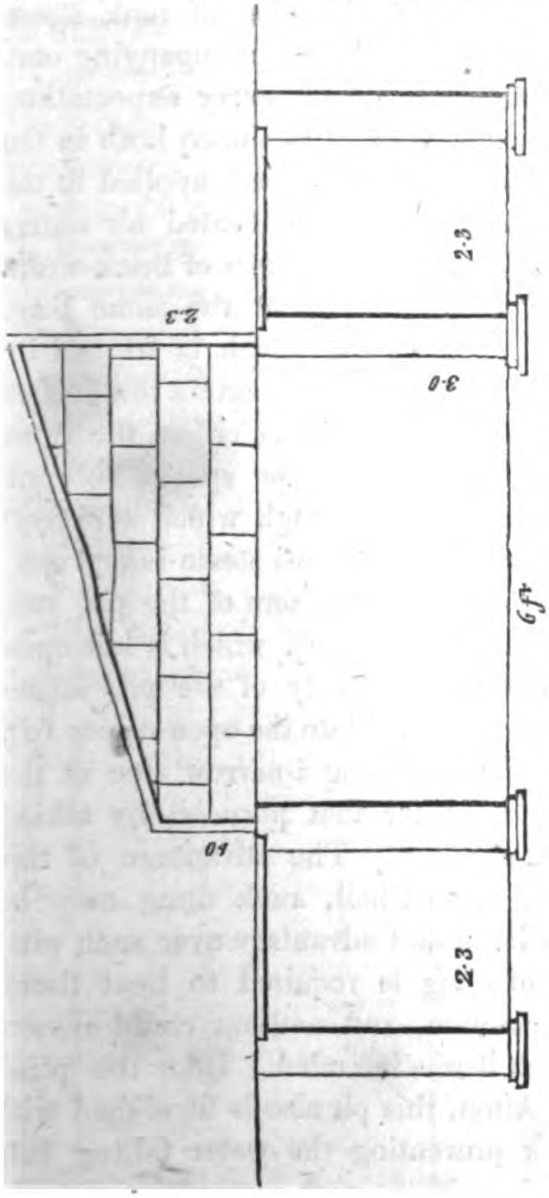




basement (*c c c c d*), on which the frame is placed, which are flues of brick-work, having the side or outer walls built open, as shown in the section, &c.; round these perforated walls, linings of hot dung, or dung and leaves are placed, the heat of which enters the flues, and heats the mould (*c c c*) in which the plants grow. The chief advantages of this pit are, that the dung requires no preparation before using, and consequently none of the heat is lost, whereas in most other pits, the dung requires to be considerably fermented before it can be with safety used, for fear of injuring the plants by overheats, or the admission of rank steam, neither of which can be the case where this pit is used. It may, however, be objected to, on account of the first expense in the erection, and the greater quantity of dung required to produce a sufficient heat, owing to its having to find its way through the sides and covers of the flues before it can reach the mould in which the plants grow. But where neatness and order are looked to,

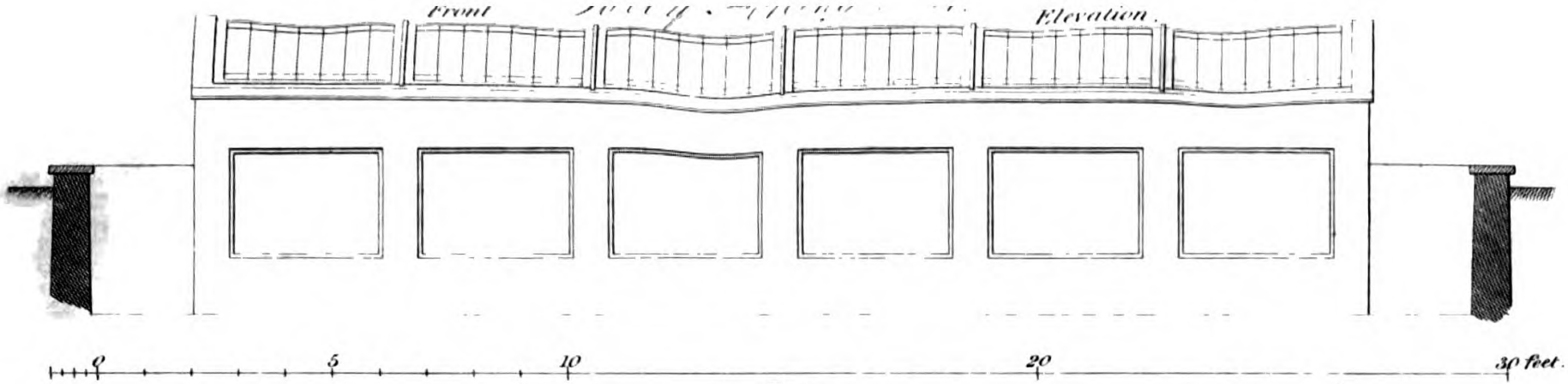
pits of any sort are preferable to dung beds, and this one, if partially sunk under the ground-surface, or surrounded with a neat wall as high as the perforations in the side walls, will have a neat and respectable appearance.

The Edmonstone pit is calculated either for the cultivation of melons, cucumbers, or young pines, and may be understood by a glance at the accompanying sketch. Its length is eighteen and a half feet, and six feet in breadth; the height of the back wall is five feet, and that of the front one, three feet nine inches. The heat is supplied by linings of hot dung, which surround the pit three feet deep and two feet three inches broad, and is separated from the surrounding ground by a nine-inch wall as high as the ground-surface, which wall is finished with a course of hewn stone on the top. The linings are covered with a wooden cover, which is supported by the above wall and front wall of the pit, and which prevents the dung of the linings from being chilled by rain or cold, and completely hides all that is so offensive to the eye in ordinary hot-beds and pits where the lining is exposed. This pit is in very general use in Scotland, and is described in a communication in the Cal. Hort. Trans. To these may be

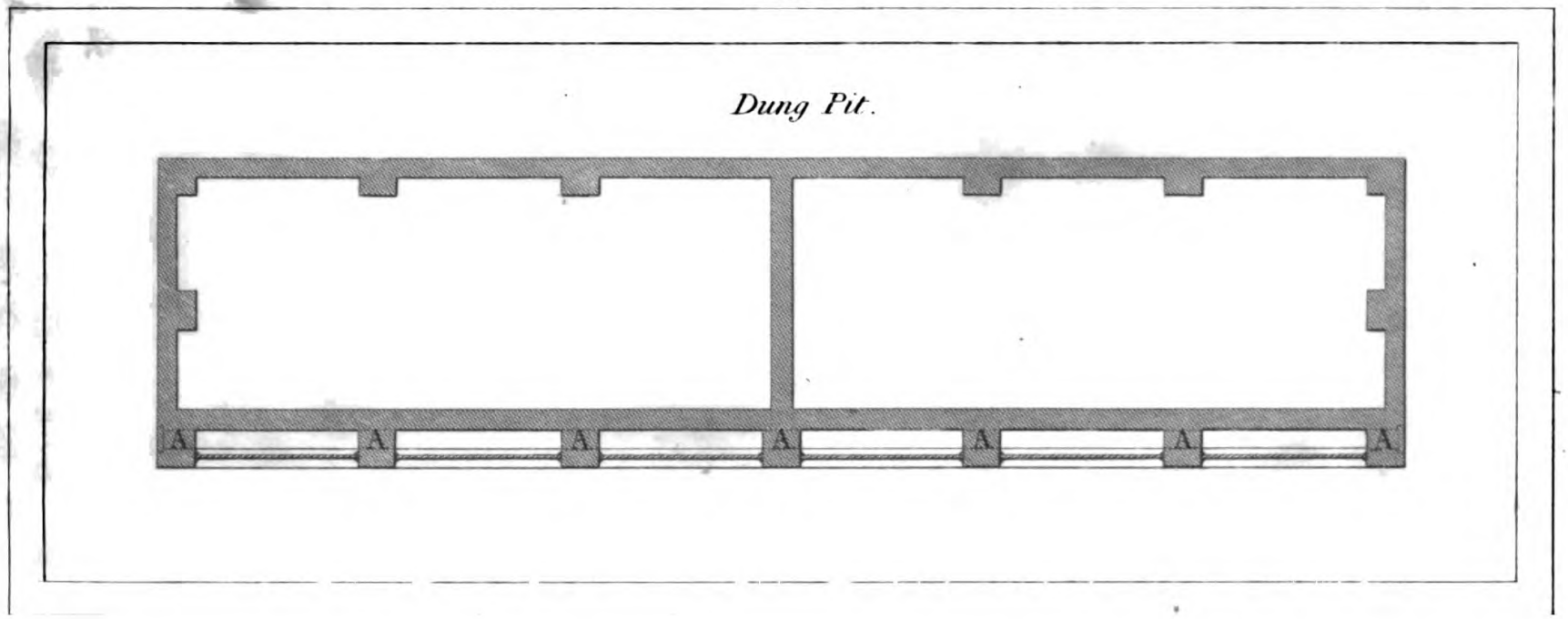


added the early and late forcing-pits, invented and much used by W. Atkinson, Esq., and which are intended for general purposes, either for growing young pines, melons, cucumbers, or forcing flowers, strawberries, &c. The latter will require no farther description than that of the engraving, which is in itself sufficiently clear, but the former differing in a material point, will require a little explanation.

The danger often attending the admission of rank steam into forcing-pits led to the invention of the accompanying one, and it has been found in practice to answer every expectation. This pit is sunk under the ground-level, as shown both in the section and elevation, and is heated by linings applied in the usual way round the sides and ends. The heated air enters through the back-wall between the open courses of brick-work, but the steam is prevented from entering, at the same time, farther than the cavity (C, *See Plate*), which is formed by placing large slates parallel with the walls, and a few inches from them. The heat from the front lining enters the front wall, which is composed of brick pillars, the spaces between them being filled with a large slate, through which sufficient heat penetrates, while the rank and noxious steam is kept out. This heat is intended to warm the atmosphere of the pit, and finds its way into it through the cavity (*d*), which is left open at top. In the process of filling the body of the pit, sometimes mould, or other matter, may fall into the open cavity (*d*), but this is easily got out by introducing a narrow hoe at the ends, where a provision is made for that purpose, by taking out the moveable stone or tile at (B). The advantage of this pit is manifest: like those of M'Phail, rank dung may be safely used, but it has this important advantage over such pits, that a much less quantity of dung is required to heat them. We have seen this pit in operation, and nothing could answer the purpose better for which it was intended. Like the pine-pits recommended by Mr. Aiton, this pit also is furnished with a gutter in front at (E), for preventing the water falling into the front linings, and which, without such a provision, would chill the heat in them, and in continued wet weather render it almost impossible to keep up the required temperature.

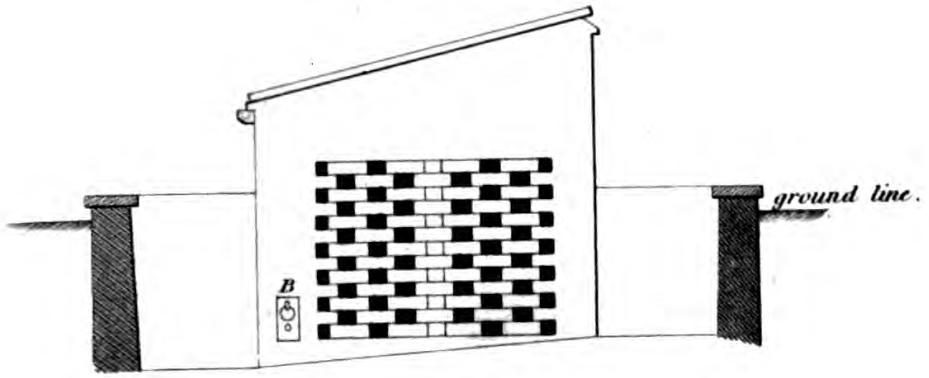


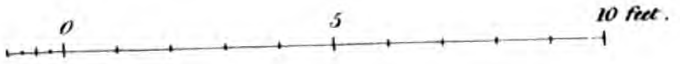
Plan



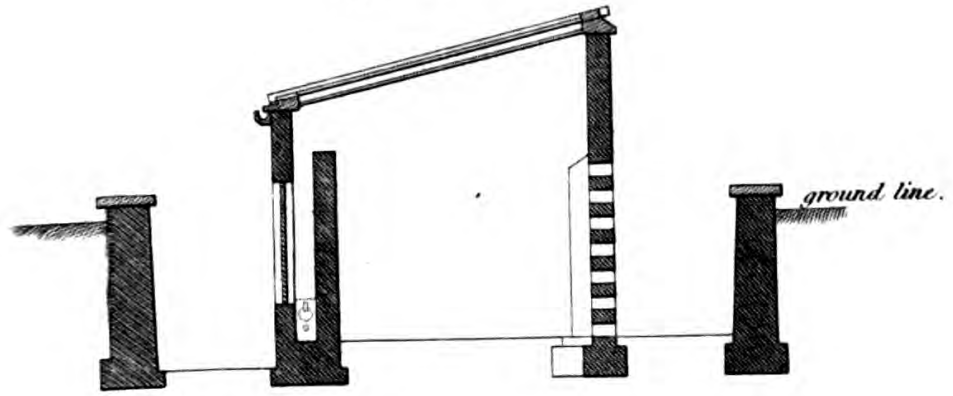
Early Forcing Pit.

End Elevation.



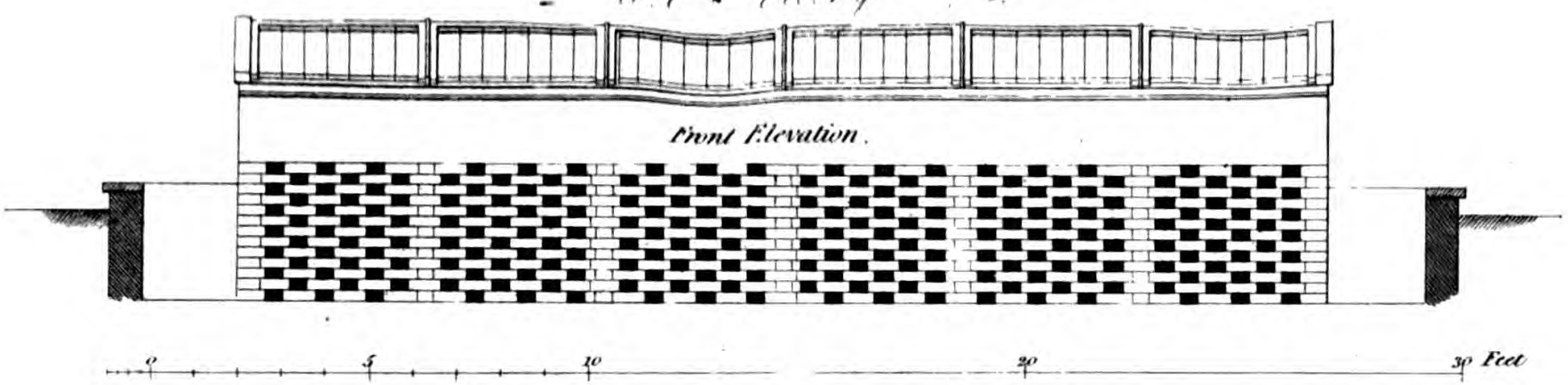


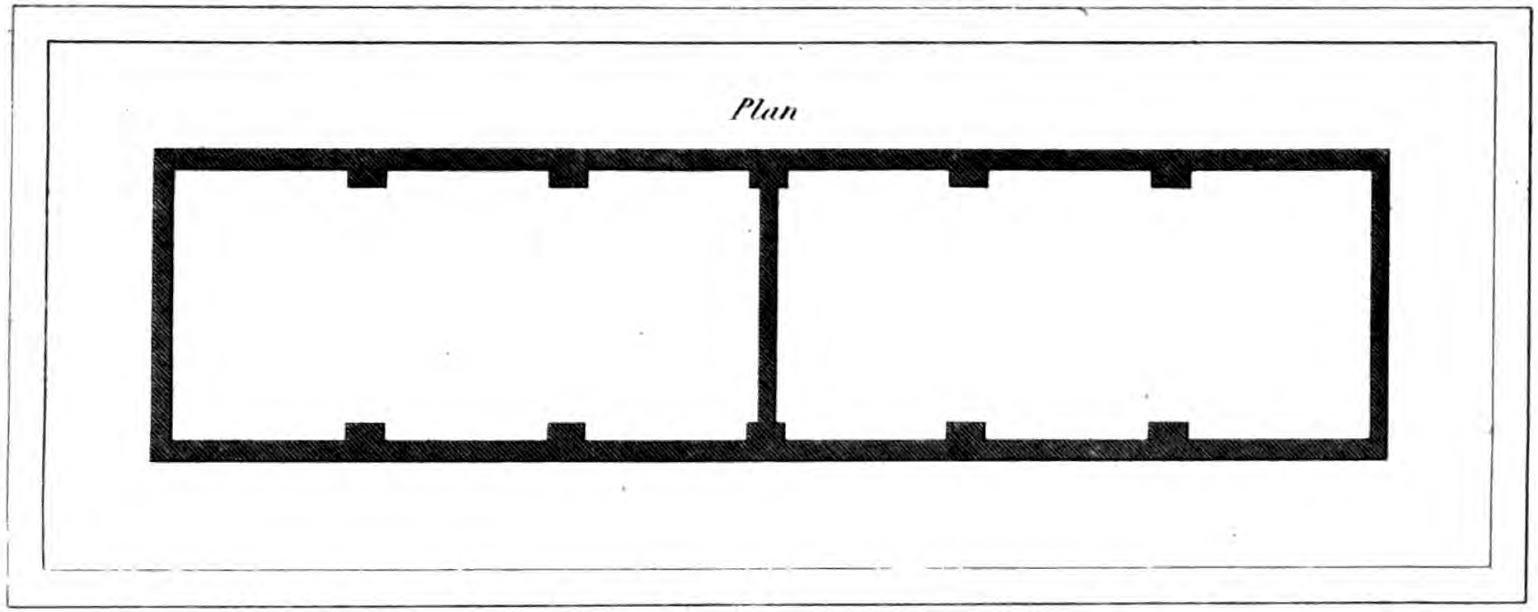
Crofs Section.



E.d Turrell fc.

London, Published by Thomas Kelly, Paternoster Row.

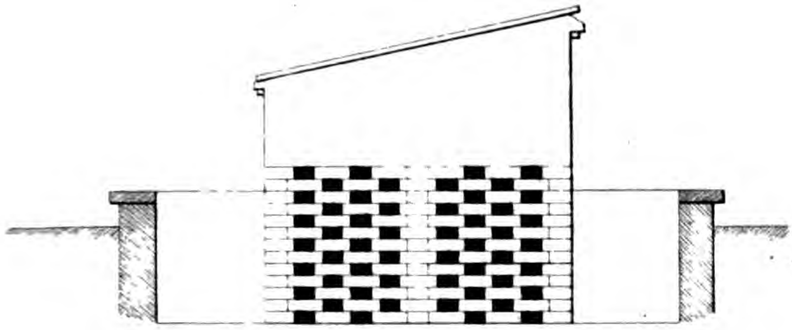


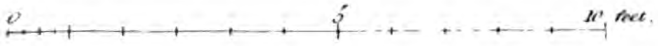


E. Turr

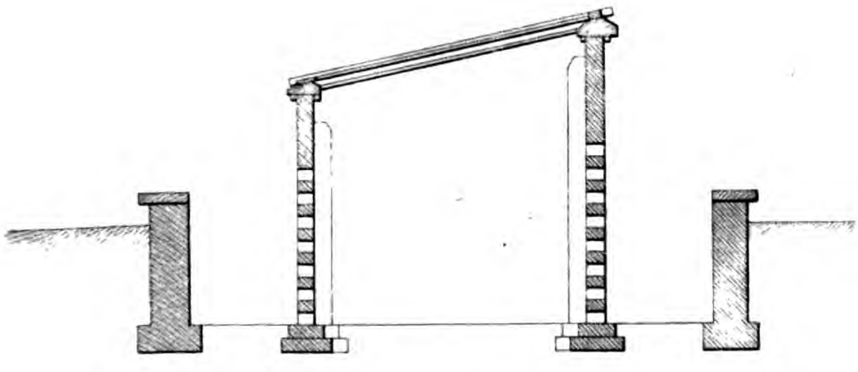
Late Forcing Pit.

End Elevation.





Section.



E.d Turrell sc.

London, Published by Thomas Kelly, Paternoster Row, May 1, 1829.

The following novel method of obtaining a crop of early cucumbers, fit to cut in January, is communicated by Mr. J. Reed, of Bristol, in the Gard. Mag.; and to those who have the opportunity, it certainly merits a trial: "On or about the 20th of September, cucumber seeds, of an approved or known sort, were sown on a moderate hot-bed in the open air, and treated in the usual manner till they were ready to ridge out. This generally happened about the beginning of November, at which time the shoots of the vines, in an ordinary vinery, were withdrawn from the house, and a dung-bed formed on the floor in the usual way. After placing the frame and mould on the bed, it may be left without the lights till the rank steam has passed off. After this, the plants being placed in the hills, and the sashes put on, the following are the leading features of management during winter. Make fires in the evening, so as to warm the air of the house to from 56° to 60°, and in very severe frosts it may be raised to 70°. In the mornings of the coldest weather and shortest days, make a strong fire, so as to raise the heat to nearly 70° when the house is shut up. About eight o'clock, and from that time to half past nine, give plenty of fresh air, by opening the front sashes and top-lights, after which, and during the remainder of the day, give plenty of air to the cucumbers, by tilting the sashes in the usual way. In mild weather, and during sunshine, the lights may be taken entirely off the cucumbers for some hours each day; and immediately after forming new linings, the top-lights may be taken down a little all night, to permit the escape of any rank steam. The advantage of this mode of growing cucumbers during winter, is the comparative certainty of an early and good crop at one-third of the trouble and expense of the common method out of doors. The expense is lessened by no covering up being required, and by all the labor attending the renewal of linings, &c. &c., admitting of being done in wet weather. The vines may be introduced in the beginning of March, (a very usual time of commencing forcing for a regular crop,) and will break regularly in consequence of the genial steam of the dung. In April, the beds may be removed, as by that time the shade of the vines will

be too much for the cucumbers, and by that time plenty of cucumbers will be in use from the beds out of doors."

We would suggest the necessity of keeping the glass, both of the roof of the house and the sashes of the frame, as clean as possible, as the rays of light will have to pass through both. The nearer that the plants can be kept to the roof of the house, the more light will they enjoy, and be less liable to be drawn up weakly, the only objection we see to the process.

In preparing to cultivate cucumbers and melons, either upon beds composed of dung only, or of fagots to be heated by means of dung-linings, it will be necessary, in the first place, to prepare dung wherewith to form a seed-bed. For this purpose, such a quantity of good fresh dung should be procured as will be sufficient, after being well fermented, to form a bed about five or six feet wide, and three and a half or four feet long, and about five feet high at the back, and four at the front, upon which to place a one-light frame, which will be sufficient for the purpose of rearing seedling cucumbers and melons for any ordinary family. The dung for this purpose should be under the process of fermentation for a sufficient time to allow the fiery heat and rank steam to be fairly exhausted, during which time, it should be frequently turned over, and well mixed at each turning, so that the whole body of dung will heat equally when put up into the bed; this is of much consequence, as if not done before the beds are made and the seeds sown, it cannot be done afterwards, independently of which, the heat will be more permanent and equal. The length of time that the dung should be thus in a state of preparation, must be determined by the state of the weather, and the quality of the dung. In building the seed-bed, let the dung be well shaken with a fork, and regularly laid up one course above another, and well beaten down with the back of the fork, but not trodden with the feet. When it is of sufficient height, place the frame upon it, and put on the glass, which may be covered up with mats, either single or double, which will help to draw up the heat. When this is sufficiently up, level the surface of the bed, and to guard against

accidents, from too much heat or noxious steam, let the whole surface be turfed over, the turfs being laid with the grassy side undermost, and beaten well with a spade or turf-beater, to render the joints as close as possible. Then cover the whole with any light mould, or rotten tan, to the thickness of six or eight inches, upon which to place the pots with the seeds. This covering should be as dry as possible, as it is much easier at this time to water, if too dry, than to render it dry, if too wet, the sun at this season having little power to evaporate any superabundant moisture. The seeds may be sown in small pots, or shallow pans, filled with rich light mould, and covered to the depth of two inches, and placed upon the surface of the bed. As the heat rises, the pots or pans may be either plunged deeper, or still kept upon the surface, accordingly as the heat of the bed may be more or less strong. The bed, from this time forward, must be regularly covered every night with mats, either single or double, according to the state of the weather and the heat of the bed. No air need be admitted, until the heat in the bed begins to rise and the steam begins to appear; but, upon the appearance of steam, and the young leaves of the plants, care must be taken to tilt up one end of the sash, less or more, to allow the steam to pass freely off: this must not only be attended to during the day, but during the night also. If the air be very frosty, or the winds cold, then the ends of the mats should be allowed to hang over the opening, that the air may be broken, and not allowed to blow with force upon the tender plants. Throughout the day, when the light is tilted up for the admission of air, a thin piece of mat should be hung over the opening, for the wind to pass through before reaching the plants. In covering up at night, care should be taken not to allow the ends of the mats to hang over the sides of the frame, particularly after the linings may have been applied, for when this is not attended to, it often occurs that the noxious steam from the dung will be so confined that it cannot escape, and be thereby conveyed into the frames, and destroy the plants.

The temperature of the seed-bed should be kept up to from 65° to 75°, but a few degrees of difference are not of that importance which is usually attached to it; indeed, the plants will

not hurt in any temperature varying from 60° to 80°, provided the transitions from both extremes do not occur too frequently, and at the same time too suddenly. After the seeds are sown, the bed should be carefully watched, for fear of the mice, which will begin to abound in the frame-ground about this season, and, if not kept down, will be very destructive, both to melon and cucumber-plants. When the seeds are sown, cover each pan or pot with pieces of glass, or a bell-glass, taking care to remove it as soon as the young leaves begin to expand. As the plants appear above ground, if the mould in the pots appear to be dry, give them a little water that has stood for some hours in the bed, or which has been brought to a temperature equal to that of the bed, or nearly so; but be careful not to give much at a time. If the heat in the bed becomes too violent, then, if the pots or pans have been partly or wholly plunged, draw them up a little, or take them up altogether, and stand them upon the surface until the bed declines in heat; without this precaution, the roots of the plants would be liable to be destroyed by too much heat. As the plants begin to grow, admit air in a sufficient quantity, at all times, into the bed, to guard against drawing the plants up weakly, and remove the mats as soon after sun-rise in the morning as possible, to give the plants as much of its invigorating influence as possible.

If the bed be not placed in a situation extremely well sheltered against cutting winds, it will be necessary to protect the linings with reed-mats, hurdles thatched with straw, or bean-haulm, or such like materials; for, when the wind is allowed to blow violently against the bed, the heat can never be depended upon, and will never be uniform. Sometimes a fine steady heat will be blown out of a bed of such small dimensions in a few hours; and, if not blown out altogether, will be blown from one corner to another, consequently one part will be too cold, while another is too hot, and the plants will be all endangered, and perhaps some, if not all, totally destroyed. In building a seed-bed at this season, it is advisable to make it at least a foot or fifteen inches larger than the frame; this allowance can be readily cut off, when it is found necessary to apply linings; and if, in forming the bottom of

the bed, there be laid a foot or eighteen inches of branches or fagots under the dung, it will render the bed less liable to be injured by damp.

When the plants are a little advanced, with the seed-leaves about half an inch broad, which they should be in five or six days after their first appearance, they are then fit for being transplanted into nursing-pots, to acquire sufficient strength to be afterwards planted out on the bed where they are intended to produce their fruit.

Before proceeding to plant them into nursing-pots, it will be necessary to have the pots and a sufficient quantity of rich dry light mould, chiefly decomposed dung from an old hot-bed, and vegetable mould well decomposed, carried the day before it is to be used into the frame, that the whole may be of equal temperature, for the young plants to experience as slight a check as possible in their removal from the seed-pot to that of the nursing or succession one, which pots should be about three and a half or four inches diameter at top, and as much in depth. Let the pots be filled about one-half with the earth, then turn the young plants carefully out of the seed-pot, breaking the fibres as little as possible. Place three plants in each pot close to the sides, so that their young leaves may rest upon the top of the pot, then cover their roots with the mould, carefully rubbing it fine with the hands, and filling the pots nearly up to the brim. The deeper the young plants are placed in the pots now, the better; for they will push out roots all the way up the stem from the original roots, as far as the surface of the mould in the pot. The mould should be dry, and, in filling it in, not by any means pressed, but put in quite loose, and the whole should have a gentle watering over-head with a fine-rose watering-pot, which should be constantly kept in the frames at this season full of water, which should be of a temperature, as near as can be, to that of the atmosphere of the frame. This being done, stir up the surface of the bed and replace the pots, either plunged or half-plunged, according to the state of the heat in the bed. Keep up now a brisk heat, by means of linings round the sides of the bed, so that the temperature within the bed may be kept to about 60° or 65° in the night, and a few degrees of a rise

in sunshine. The great objects to guard against at this season, are too much rank steam, and an excess either of heat or cold. Air should be admitted as freely as the weather will permit, that the plants may not be drawn up too weakly. The bed should not only be examined morning and evening, but also once or twice throughout the day, until the plants get a little stronger; if the roots be in danger of being destroyed by too much heat, take the pots up a little; and if too cold, plunge them a little deeper into the bed. As soon as the first seeds are above ground, a few more should be sown as a substitute in case of accidents, and this second sowing should also be succeeded with a third, and so on. In ten or twelve days after this seed-bed is put up, it is probable that the heat will be beginning to decline; this should be watched for, and, upon the least appearance of it, a lining of well-fermented dung should be applied to one or more sides of the bed, as may be judged necessary; this lining should be protected in the same manner as has been directed for the bed, by covering it round with reed-mats, long littery dung, or bean-haulm, which will not only keep the bed and lining perfectly dry, but will also prevent the wind from blowing the heat out of it. The lining thus put round, should be from fifteen to eighteen inches thick, and a few inches above the bottom of the frame. It should not, however, be built either too thick or too high at this time, lest it throw too much heat suddenly into the bed, and thereby endanger the plants. The inside should be examined, and a little fresh dry mould laid all round the inside of the frame, to prevent the admission of too much steam; for although a certain portion of steam is necessary for the welfare of the plants, so as to keep up a moist warm atmosphere, yet too much would be attended with danger; upon examining the bed in the morning, a sufficient quantity of steam should be found to appear like a fine dew all over the plants, and hanging in beads upon the under side of the leaves. In ten or twelve days after the first lining is applied, it may be necessary to apply it to the remaining sides, which will revive the heat of the whole, and if covered over also with any dry littery matter, to resist the cold cutting winds, and cold rains or snow, it will keep up a sufficient heat for some time longer.

By the end of this month the plants will be fairly established in their nursing-pots, that is, if the seed were sown about the first of the month. As soon as they have formed two rough leaves, the bud that is to produce the shoots or runners will appear between the two leaves; this embryo shoot should be taken out, either with the point of a knife, or carefully pinched out with the finger and thumb, but so as not to injure the leaves of the plants. This shortening, or stopping, as it is called, will render the plants more stocky and strong, and will cause the emission of a number of other shoots, which will be more prolific, and they in their turns, when stopped, will not fail to show plenty of fruit; whereas if this first shoot were allowed to proceed without stopping, they would probably run two or three feet without showing fruit, and would be both sterile and slender. Some gardeners, however, consider this shortening or stopping the plants in this young state to be a matter of little consequence, and allow them to run to three or four joints before they stop them.

FORCING STRAWBERRIES.

Strawberries are brought to early perfection in every description of forcing-house, pit, or frame, with more or less success, which, in a great measure, depends upon the plants being properly prepared before bringing into the house, of proper sorts, upon the soil being suitable, and during their growth being bountifully supplied both with air and water; the latter in perhaps more abundance than for almost any other plant which we force. Many sorts of strawberries force well, but the Alpines, Bath Scarlet, Grove End, Scarlet, Roseberry, and Common Scarlets succeed best, and are most generally chosen for that purpose.

Young plants, that is, runners of the preceding year, are almost universally preferred, and are potted in April, two or three plants in a pot of eight inches diameter, and six inches deep. These are plunged in the earth all summer, giving them plenty of water and keeping them clear of weeds, where they remain till taken into the forcing-house or pit. But the runners of the same year, taken off in July, and planted in

pots of the above dimensions, are found often to succeed well; these latter should be plunged in the open borders up to the brim, being shaded after planting for a few days, till they have struck root, and afterwards watered as they may require till autumn, when the pots are partially covered with rotten tan, or long litter, to prevent the pots from being broken by the expansion of the damp mould within them; they are thus left till spring, when the covering is removed, and the surface of the pots is stirred up; part of the mould is also removed, and replaced with some very rich loam, highly manured; the ground also among the pots is stirred up to clear it of weeds. During summer, the flowers, as they appear, are carefully cut away with a pair of finely pointed scissars, as soon as they appear to be forming, this is practised as long as they continue to appear; the pots, and ground round them, being kept clear of weeds and frequently watered. Here they remain till they are wanted to remove into the house or frame. For a large family, not less than one thousand pots will be required to be always in a state of preparation, for the purpose of keeping up the supply; and, when taken in, such as are of a weakly appearance should be rejected.

Alpines are found to succeed best when raised from seed sown in January, (or before,) in boxes or large pans, placed in a mild heat. In spring they are gradually hardened, and are potted off in May, in pots of the same size as those above-mentioned, placing three or four plants in each. During summer, they are kept in a cool and shaded situation, plunged up to the brim or nearly so, and, if the weather be dry, are supplied with water, and sometimes with liquid manure, which is applied to the surface of the pots, taking care not to spill any upon the foliage. They are, likewise, kept clear of weeds, and in October, when they are coming into flower, they are put under shelter. Cold frames, if such can be spared for them, are preferable to any thing else; placing the pots closely together, to occupy as little space as possible, and covering the floor on which they stand with coal ashes, to prevent, as much as possible, the entrance of worms. During their stay in this situation, if they be once or twice watered with lime-water, the worms will be destroyed. They are to remain here till

required to be removed into the forcing-house or pit. Such as are the earliest and fullest in flower, should be removed in November into a slight hot-bed prepared for them, and if they remain here till their fruit be set, they may be removed into the pine-stove or succession-house, and placed upon shelves erected as near to the glass as possible. These shelves are generally suspended by wires, or slight brackets of iron, fixed into the under side of the rafters of the house, directly above the footpath, or such parts of the house, as the water spilt in watering the strawberries will not fall to injure the pines. Each pot is placed in a pan, both to prevent an unnecessary loss of water, as well as to keep the roots moist and cool; strawberries, by this means, may be had during the winter months with tolerably good success.

But for a more general crop of this esteemed fruit, the beginning of January; the beginning and middle of February; the beginning, middle, and end of March are much the best seasons for beginning to force. At these seasons, the plants in pots still remaining in the open borders, covered with litter, rotten tan, or any preferable substitute, and such Alpines as still remain in the cold frames, particularly such of them as have not come into bloom, or such as have had their flowers cut out of them, should now be brought in, in regular rotation. The number of pots introduced at once being in proportion to the stock potted, or the demand for the fruit.

The pots should be well cleaned, and all dead or decayed leaves removed; the surface-mould in the pots carefully stirred up, and a part removed, the pots should then be filled up with rich yellow fresh loam, well manured with rotten dung. Place each pot in a pan, and give them a little water, if at all dry; and once or twice during their period of forcing, give them a watering with the drainings of the dunghill, or water in which sheep or cows' dung has been steeped. For the general crops of strawberries to be forced, if there be the convenience of frames and dung, they will be much improved by being kept in them till the fruit be set; but if there be the convenience of a cherry-house, or peach-house, beginning to be forced, a few weeks in either of them will be a good situation for them. Indeed, the temperature of the cherry-house is the

most natural for the strawberry, and in such a temperature the crops will be more certain. They may be removed to the pine-stove to ripen off, and thereby be improved in flavor, at the same time that they make way for a succession crop being brought into the cherry or peach-house. They may be also successfully forced in a flued pit, or in a pit warmed by external linings of dung, or dung and leaves, or they may be grown well in common frames heated by the same means, only, in this latter case, they are attended with more trouble. Where they are to be extensively forced, a range of pits will be found the most convenient and suitable place, as they can then be plunged into a mild bottom-heat, which, if not too warm, will keep both an equality of temperature and moisture round their roots, which is of the utmost consequence to all plants of rapid growth in pots. In such compartments, a regular temperature can be kept up, varying from 50° to 55°, and not to exceed 60° until the fruit be fully set; after that, the temperature may be allowed to rise gradually to 65° and 70°. During the growth of these plants, while in blossom, and while swelling their fruit, an abundance of water should be given them, and continued until swelled to their full size; after which, it should be gradually withheld, so as not to injure the flavor of the fruit; but this change of moisture, like that of temperature, should not be suddenly effected, but withdrawn by degrees. Nothing is so injurious as those sudden changes of temperature and moisture, which we see so frequently practised.

In whatever way strawberries are forced, it is of material consequence to them, that they have air admitted to them in large portions, particularly while in flower and while the fruit is setting. Hence the advantage of pits for them, where they can be managed, as far as regards this important object, as well as suited with a temperature to their respective stages of growth. Strawberries, unlike most other perennial plants, will not force well above one season; but this is an object of little consequence, the means of always procuring young plants being so easily attained; and, as such is the case, a fresh supply should be prepared annually.

When the crops are gathered of those brought earliest into fruit, they should be thrown away, but such as have been forced

into fruit at a more reasonable season, should, after the crop is gathered, be carefully taken out of the pots, and plunged, with their ball entire about their roots, in a sheltered border, where they will, particularly the Roseberry, Grove End, and common Scarlet, produce a good crop in the September following, when other strawberries are scarce. The rains of the latter end of July, and beginning of August, are extremely favorable for the growth of the fruit, which cannot fail to be an acceptable addition to the Alpine, which is the only strawberry in fruit at that time. Where provision has not been made, by potting a sufficient number of young plants, then recourse must be had to such as are older. In this case, young plants established in the open ground, during the previous season, may be carefully taken up in autumn with good balls, and potted in pots of dimensions suitable to the sizes of the plants, and, after being well watered, may be kept in reserve for removing into the forcing departments when wanted; but in this case, it will be attended with more success, if they be not brought into vegetation till March, or, at all events, the middle of February.

To prolong the season of this fruit as much as possible, a variety of sorts should be potted at different times, and plunged in different situations, and as they begin to show a disposition to bloom, should be picked out and removed to temperatures agreeably to their habits and state of growth. By such means, where there are many forcing departments, this useful fruit may be had at all seasons of the year. The Alpines appear best suited for a late crop in a cold shaded situation in autumn, and are amongst the best for bringing into a state of vegetation earliest in the hot-houses or pits. The Scarlets are found to bear a greater degree of heat than any other, but do not set their fruit so freely in the short and cloudy days of winter as the Alpine.

The soil in which strawberries to be forced seem to thrive best, is a strong and very rich loam, well manured with rotten dung, and, in potting them, to place two inches of rotten dung in the bottom of the pots.

FORCING ASPARAGUS.

Asparagus was one of the first culinary vegetables accelerated by artificial means. The London market was supplied, before the middle of the seventeenth century, with forced asparagus, at an early period of the year; and it is still brought to Covent Garden market during the winter, in greater perfection than to any other market in the world. It is brought to perfection in a variety of ways, from the beginning of November until it comes in, in the open ground. Asparagus requires a much less degree of temperature to produce it in perfection than almost any other vegetable, and is much sooner injured by a strong heat, particularly if attended with much steam. In preparing dung, therefore, for forming beds on which to place the roots, or for external linings, more than ordinary care should be taken to have it well prepared, that is, by having it repeatedly turned and fermented, until the greatest part of the rancidity of the dung shall have evaporated.

The most general mode of forcing this esteemed vegetable is, by making dung-beds, in the usual way, about three feet high, of well-prepared dung. When they are finished, put on the frames and lights, such as are generally used for growing cucumbers and melons; in this state the bed should remain till such time as it has thoroughly attained a regular heat, and has, what is technically called, well sweated itself. When this has taken place, level and tread the surface regularly over. If there be any apprehension of a violent heat taking place after being thus prepared, the surface should be covered with turf cut thin, and so placed, with the grassy side undermost, that the joints may so unite with a slight beating with the back of a spade, as to prevent the steam from rising into the bed, which would be extremely detrimental to the crop in a state of vegetation. However, unless the heat is suspected to become too strong, by the dung not being properly prepared previously to forming the bed, this covering will be rather detrimental to the heat that is really necessary, by preventing it from rising, and may, in such cases, be dispensed with. The bed thus prepared should be planted with the roots, which are generally taken from the asparagus-beds in the garden, and, as

was directed in the *Culinary Garden*, should have been covered in autumn with littery dung, leaves, or similar preventives, to keep out the frost.

It is immaterial of what age the roots may be, provided that they are strong and vigorous, and have produced a good crop of strong shoots the preceding season. Some gardeners lay much stress upon the age of the roots, some recommending roots of two years' growth and upwards. We have, however, found strong healthy roots of thirty years' growth succeed equally well with those of four or five years' standing. Certainly, roots above four years' growth, are to be preferred to those under that age.

The roots should be carefully taken up, injuring the long fleshy fibres as little as possible, and removed to the prepared bed, which should, previously to the plants being placed upon it, be covered with a few inches of dry light sandy earth, no matter how poor, rotten tan or loamy sand will answer equally well. When this stratum of mould is laid on, and levelled over the surface of the bed regularly, begin at one end of the bed, and place the roots closely together in regular order, keeping the crowns uppermost, and all of them as nearly level as possible. A bed of three lights, and of the ordinary dimensions, will require not more than six hundred roots, if they be young, but a much less number of old and larger ones will fill it; this must depend, however, entirely upon their size, older ones, of course being larger, fewer will be required, and a frame of the usual size of three lights, will, under ordinary good management, produce a dish every day for nearly three weeks. The roots being thus placed should be covered with some finely sifted light dry mould, and sprinkled first thinly over them, to allow of its filling up the spaces between the roots; after this they should be covered with any light mould or rotten tan, to the depth of four or five inches. The bed being thus finished, should then be covered with the lights. Should the heat become too strong, the glasses may, at any time, if fine weather, be taken entirely off during part of the day, which will allow the rank heat to escape, and, until the buds begin to vegetate, cannot injure the roots; but this will seldom happen, if the dung has been properly prepared before using.

If the heat should not come freely, keep the glasses shut down, until it rise and the buds begin to vegetate; after which air should be admitted as freely as possible, and, after the buds begin to appear above ground, if the weather will permit, they should be removed for as long a time as possible each day, or as much air given, in less favorable weather, as can be done without injuring the shoots with frost, in order to give both color and flavor, as well as strength to the shoots; if this be not attended to, the shoots will be drawn up weakly, without color or flavor.

On the continent, attempts have been made to blanch the shoots of asparagus, to render them more delicate. Should this be desirable, the lights may be shaded with mats or other means, to give the desired effect; but with us, the better they are colored at this season, the more they are held in esteem. When the buds are sufficiently grown to be fit for use, they are to be gathered as recommended for gathering this crop in the open air, using every caution not to injure the buds still under ground. The mould should be cleared away with the finger or knife, and the shoot cut out near its bottom, and the mould replaced. It is seldom that asparagus, while forcing in dung-beds, requires much water, the natural moisture of the steam will be found nearly sufficient. Should the bed appear dry, however, a slight watering may be given with a fine-rose waterpot, the water being brought to a temperature nearly equal to that of the air in the bed. When the bed heats violently, a copious watering should be given and repeated, to prevent the roots from being scorched with the heat.

If the temperature of the bed during the night keep to 50°, and throughout the day, by the addition of sun-heat, to 60°, the heat will be perfectly sufficient; when, however, it falls below 48°, and from that to 45°, linings must be applied. Asparagus will grow in a temperature of some degrees higher, but unless forced to accelerate the crop, for the purpose of answering the demand on a particular day, it will be more advisable to keep to the temperature of from 50° to 60° during the whole process.

Asparagus is successfully cultivated during winter in pits heated by steam, fire, or hot water, made to circulate in

pipes through the pits, where dung, leaves, or tan, are not readily procured, or where the pits are placed contiguous to the culinary forcing-houses; and, where neatness and order are attended to, these means will be preferable to dung-beds, as from the nature of their materials and structure, they have no very inviting appearance when placed out of what has hitherto been called the melon-ground, which has generally more the appearance of a dung-yard than any other appendage to a well-ordered garden. Where economy is an object, and plenty of dung to be had, the success will be complete upon such beds with little trouble or expense; but where neatness is more an object, any of the other means will answer equally well, under the same treatment already laid down for dung-beds, only, from the nature of fire-heat by means of hot flues, water must be given to the roots in sufficient quantity to keep the mould always in a state fit for vegetation; not that the roots of asparagus, or any other perennial root similar to it, require that share of food, which is supposed by some to be derived from the mould in which the roots are placed during their period of forcing, but to keep it in a state sufficiently moist to promote that genial atmosphere, in which almost all plants prefer to live, as well as to keep the degree of moisture equal at their roots, and not to have them scorched up by the heat of the flues. It is seldom necessary, for the production of this vegetable, to have recourse to such a degree of heat, as to require the flues to be kept hot so long as to give a sufficiency of moisture to the atmosphere of the pit, by pouring water upon them; for which reason, the necessity of giving it to the mould becomes the more apparent. Pits heated by means of steam can be readily steamed, or kept in a moist state, by allowing a part of it to escape in the pit, at such times as may be deemed necessary; still it may occur that water may be required at their roots also, although in a less degree. The pits heated by means of hot water made to circulate through them in pipes will answer every purpose of the above, and although not yet in general use, will, in all probability, be generally adopted in all forcing-gardens, particularly in pits for the acceleration and maturation of fruits, culinary vege-

tables and flowers, as they are proved to answer every purpose of steam, without the expense of erection or after-keeping.

Asparagus may be cultivated upon beds formed of fagots, heath, or any like material, and heated by means of external linings of hot dung; in such cases, there will be a material saving of dung, as one bed of fagots will produce two or three crops in one season. As soon as one crop is cut, clear off the old roots and mould, and throw them away, they are considered as useless, no leaves being allowed to form, of course no buds would follow, and replace the bed with fresh ones. In using such beds, it is advisable to turf them over, to prevent the mould falling in among the fagots, as well as to prevent the roots from sinking in inequalities, and to keep the roots from being too much dried or burnt by the heat. In whatever way asparagus, or most other plants are forced, too much bottom-heat should be guarded against, and every means used to admit the heat to ascend in sufficient quantity to warm the atmosphere of the bed or house in which they are placed.

Upon the supposition that a bed or pit has been planted about the beginning of the month, another should be got in readiness to be planted in like manner towards the middle, and preparations for a third to be planted towards the end of the month. When a large supply is wanted, a bed should be planted every ten or twelve days, from the beginning of November till the end of March, when the last put up will continue to yield till it be produced in the natural ground.

Cover the frames or pits with mats at night, according to the state of the weather, but remove them always during the day, after the shoots are above the ground.'

FORCING FRENCH OR KIDNEY-BEANS.

The kidney-bean, being a native of India, is only had in perfection with us in the warmer months of summer. It cannot be ventured in the open air till all chance of spring frosts is over, and it is destroyed by the first frost in autumn. To prolong the season of this vegetable is a desideratum in most families, who have the means of cultivating it, and the opulent citizens of

London, and other rich and populous cities, are supplied with it by the market-gardeners, who find it to their advantage to bring it to market as early as possible. From the natural habits of this plant, it is well calculated for cultivating in a high temperature, and those who have the means of a pine-stove can produce it in high perfection; more humble cultivators, however, manage to produce it very early upon beds of hot dung, flued pits, &c.

It is most generally cultivated in the pine-stoves, being a temperature exceedingly well suited to it; for which purpose large pots, and more often boxes or deep shelves are placed in these compartments for the reception of the plants, which should be sown in pots or deep pans, as thick as they can be placed together, in light rich mould; but to render the operation of transplanting less injurious to them, the bottom of the pots or pans should be filled with rotten dung pressed closely down, over which a thin stratum of fine light rich mould should be placed, on which to plant the beans. They should be covered two inches with the same rich mould, and well watered. When this is finished, remove them to the shelves of the pine-stove, or upon trellised tables placed over the flues, at that part of the house most remote from the fire. These tables or trellises should stand five or six inches clear of the flue. In a few days they will vegetate, when plenty of water should be given them, keeping them rather moist than otherwise. When they are fairly above the mould, remove them to a situation in the house, where they will be near the glass, and as much exposed to light and air as possible, so that they may not be drawn up too rapidly. This should be attended to throughout their culture, as if drawn up weak and straggling, the crop will be scanty, and the plants sickly. After standing a few days in such a situation, to become stocky and furnished with roots, they are then in a fit state to transplant into the pots or boxes, where they are to remain to perfect their crop. They may be at this stage of growth much strengthened, and rendered more productive, by being planted out into small pots, of the size generally known by the name of small forty-eights, one plant in each pot. They should remain here for a fortnight, by which time the roots will have

multiplied, and the plants have assumed a stocky stout appearance. Upon finally removing them into the pots or boxes where they are to remain, care should be taken to injure their roots as little as possible, and the dung which was placed in the bottom of the seed-pot or pan will be found useful in forming a ball at the root of each plant, by which means they will sustain little, if any check, in their removal. The boxes or pots into which they are finally planted should be filled nearly half full of good rotten dung, such as that from an old cucumber-frame, or some similar to it. If in boxes, they should be a foot in depth, and of such lengths and breadths as are most convenient for the situations in which they are to be placed, so as to take up as little room as possible; and if pots be preferred, they should be nearly ten inches in diameter, and a foot deep. After being half filled with dung, according to the directions already given, cover it with an inch and a half of very rich loam, upon which stand the plants, three in each pot, and about the same proportion in the boxes; fill in with mould, such as is already directed for placing under the roots, till the stems of the plants be covered up to the leaves; or, if they be a little drawn, about half way up their stems, leaving space within the pots for a further addition of mould, as the plants proceed in growth. After planting, they should be supplied with a moderate share of water, brought to nearly the temperature of the house, to settle the mould about their roots. This should be administered to them as occasion requires, keeping them rather damp than otherwise, but not so as to endanger their damping off. This is necessary to keep them free of the red spider and thrips, both of which, particularly the former are very annoying to them, and if not watched carefully, will not only destroy the plants themselves entirely, but will attack every other thing in the house. Water is one of the means of keeping down this enemy, and it should be given them with some force from the syringe; flour of sulphur may be sprinkled over the leaves, either dry or mixed with the water with which they are sprinkled, the strong heat of a pine-stove will ignite the sulphur, and completely destroy the spiders. The thrips is destroyed by fumigations of tobacco. As the beans advance, small branches should be stuck into

the pots or boxes, in order to support the plants; and where they shew a disposition to become climbing or straggling, top them a little, which will induce them to throw out lateral shoots.

The sorts most generally preferred for forcing are, the *Dun-colored*, *Early-negro*, and *Speckled-dwarf;* and, for successional crops, should be sown every fortnight or three weeks from this time till March.

French-beans are also successfully cultivated in flued-pits, in common dung hot-beds, and, in both cases, are first reared in seed-pans or boxes, and when about three inches high, are pricked out for good, in rows across the beds, which are prepared for them, of light rich loam and nearly half-rotten dung, or where it can be had, rich vegetable mould. They are treated, as to watering and supporting, in the same way as if in the pine-stove, watching carefully the progress of the red spider and thrips, which must be subdued by the same means already recommended for those in the pine-stove. The trouble, however, of growing them in hot-beds is such, that few attempt it so early in the season, neither is the fruit so fine nor yet so plentiful, as when produced in either a pit or stove.

The *Early-dwarf white*, from its dwarf habit, is preferred for pits or frames, and so is also the *Early yellow*, and *Early black*, as being next in point of dwarfness; neither of them, however, is so prolific as those recommended for the stove. Great care must be taken to cover every night with mats, or other means more convenient, for a slight degree of frost would prove fatal to them at this season. Their extreme tenderness is not so well suited to the hot-bed frame, where the degrees of temperature are liable to changes, from a variety of causes over which the cultivator has no control, and which he cannot either foresee or resist till it be often too late.

The temperature, in pits or frames, in which kidney-beans are grown, will require to be kept up to 65° throughout the night, and 75° throughout the day, both taken as the maximum. It will be more convenient in pits or frames to accommodate them with air, therefore this should be attended to at all seasonable times. A free circulation of fresh air, plenty of water, and a high temperature, all of which can be obtained

in a pit heated by fire, steam, or hot water, will produce abundant crops of beans. When the plants are in full bearing, they will be much invigorated by having an application of liquid manure applied to their roots, and also once or twice during the growth of their fruit, and even while in blossom.

Kidney-beans are sometimes grown in vineries and peach-houses; in the former they are liable to be too much shaded, and in the latter, the red spider, of which it is difficult to keep them entirely clear would be dangerous to introduce, as the tender leaves of the peach, when once attacked with that insect, are sensibly injured by it; besides, either of these departments is much better suited for strawberries than for beans.

FORCING POTATOES.

This valuable root, although capable of being preserved from one season to another, is nevertheless required in a young state at the tables of the rich nearly three-fourths of the year, and various modes have been tried to produce this esteemed root at an early period of the year. A slight degree of temperature is found sufficient for the purpose; but, like many other exotic vegetables, it is extremely impatient of frost. In the open air, it is one of the first that indicates the temperature of an autumnal night. In cultivating it at this early season, care must be taken to protect it from the effects of a low temperature, by carefully covering with mats every night.

The most general and successful mode of accelerating this crop is upon beds of hot dung. For this purpose, a quantity of dung should be prepared, by repeated turning and fermenting, until all the rankness evaporates; and when in a proper state to build into a bed, it should be put up to the height of three and a half or four feet, and the lights put on. In a few days it will be fit to receive the plants, which should be preparing, while the dung is undergoing the necessary fermentation, by being cut and partially dried, and then planted into boxes or pots in some light dry mould, and placed in any of the hot-houses then at work, or in a cucumber-frame; they will have sprung two or three inches during the time the dung

and bed are preparing for them, and when the bed is judged to be in a fit state for their reception, let a quantity of light mould be placed upon the surface, four inches thick, upon which place the young potato-plants, the roots of which will have made some progress, and cover them up nearly to the leaves with the same sort of mould; it is of no consequence whether it be rich or not, provided it be light and dry; the more sandy it is the better. Place them in rows about ten inches apart, and five or six inches apart in the row. Proceed in this manner till the frame be filled, after which, give the whole a gentle watering and shut down the lights; from this time forward, they will require all the air that can be admitted to them with safety during the day, and carefully covered every night with mats. As may be deemed necessary, refresh them with water, and frequently examine the mould towards their roots, to see that it is kept in a proper state of moisture, without which they would make little progress and produce a scanty crop. The temperature, if kept about the same as has been already directed for the asparagus-beds, will be found sufficient.

After the same manner they may be grown upon beds composed of fagots, and managed as recommended for asparagus.

The names of potatoes are so arbitrary, that it is difficult to name such sorts as may be best fitted for early forcing. The kinds generally used by us, during our practice, were the *Early Ash-leaved*, *Early Cockney*, and a sort much cultivated round London, known by the name of *Fox's Yellow Seedling*, after a person of the name of Fox, a celebrated grower of that vegetable.

Potatoes, if not improved by being transplanted, are evidently not injured by that process; we have uniformly, for many years, grown them to the height of three or four inches in pots or boxes, placed in the forcing-houses or early melon or cucumber-frames, and afterwards transplanted upon a bed prepared for them, as noticed above; and when circumstances prevented that mode, we adopted that of springing them in a basket or box mixed with mould, and afterwards planted out upon the beds where they were to remain. This we have also done with our earliest crops, planted out in the open borders,

hardening them by degrees to stand the weather in April and May, with a little protection at night.

The forcing of potatoes at an early period of the year has been noticed by few writers upon horticulture, until the appearance of the Transactions of the Horticultural Society; we therefore will make a few extracts from that voluminous work, which, from its size and the richness of its embellishments, however creditable to that body, is certainly from those causes beyond the reach of readers in moderate circumstances.

Mr. Knight cultivates potatoes upon hot-beds in the following manner: "The varieties of potatoes," he says, "which are well calculated for early forcing, begin to vegetate before Christmas; and it is of consequence to preserve the germes and roots first emitted from injury, where a crop of good potatoes is required before the end of May. I therefore plant my potatoes in pots of about six inches in diameter in January, (a single potato in each,) and the pots are then placed in the ground, and covered with litter to protect them from frost, and in this situation they remain till the hot-bed be ready to receive them. In the mean time, the excitability of the plants is not at all expended, on account of the low temperature in which they vegetate; and, therefore, when plunged into the hot-bed, they instantly shoot with excessive rapidity, and in a few days begin to generate tubers. One stem alone should be suffered to grow in each pot, for where more remain, the tubers are smaller, and the crop is not increased in weight. When the plants grow in small pots, the gardener will have apparently the advantage of being able to take out the largest potatoes, by inverting the pots, without materially injuring the fibrous roots; but this practice will rarely be found eligible, because the plants, having the range of their roots confined to the limits of the pots, soon occupy the whole of their pasture, and therefore do not produce their tubers in succession, as they will under common circumstances. The lights should be drawn off during the day, when the spring is far enough advanced to permit this being done without injury to the plants; and early in May the pots may be taken out of the hot-bed, which may be employed for other purposes; and as it must necessarily have been kept very dry during the latter period of the growth

of the potatoes, it will generally afford a strong heat when well watered. I confine my plants (which are naturally of a very dwarfish growth) to small pots, because, under this mode of culture, the tubers acquire maturity sooner, and are better; but the crop is not so heavy, as where the roots are permitted to extend more widely; and therefore, where a larger but rather later crop is required, the best plan is to put the tubers to vegetate in small pots, and from these to remove them, with their roots and germes uninjured, to the hot-bed. I tried the effect of placing a few tubers (half a dozen only) on the floor of my cellar, disposing them just in contact with each other, and as soon as the germes were about four inches long, a hot-bed was made to receive them. This experiment succeeded perfectly, and as it is not attended with so much expense and trouble as either of the preceding methods, it will be found in many cases the most eligible. All that appears necessary to obtain an early crop, is to advance the growth of the plant as much as convenient under a low temperature, so as to avoid all unnecessary expenditure of its excitability, and, consequently, to preserve its germes and roots as much as possible uninjured by transplantation."

The only real difference between Mr. Knight's method, and that which we have practised for upwards of twenty years, as described above, is that he commences vegetation in a low temperature, and ours is commenced in rather a higher degree of heat; his reason is to prevent expending the excitability of the plant. Our success has, however, been so complete, that we question much if this excitability be injurious to the potato, by our keeping them always in nearly the same temperature.

Several writers in the same Transactions adopt methods similar to the following, for procuring young potatoes. That of Mr. Ashworth is given in the following words: "In the beginning of April, a number of large potatoes are selected, and laid up in a dry airy room; they are turned over four or five times during the summer, and all shoots which they make are taken off as they appear. These are used for the seed, and are planted in succession from the beginning of September to the end of December in boxes, in the following manner: In the bottom of each box, a layer of light vegetable mould, four

inches deep, is placed, on which the potatoes are laid about two inches apart, and these are covered with another layer of the same mould, and of the same depth. On the surface of this second layer, potatoes are again laid, and then covered as before; this is repeated until the box be full. The boxes may be kept in any of the fire-houses, or in a warm back shed, and in three months from the time of planting, young potatoes fit for use will be formed. It is to be observed, that the young potatoes thus obtained are much inferior in quality to those produced by vegetating plants; but as it is scarcely possible to bring forward potatoes in beds so soon, this plan is useful, when considered as a means of obtaining a luxury at so early a season."

This simple method will afford young potatoes, certainly, at a season when they cannot be had by any other means, and may be adopted by those, who have not the convenience of hot-beds or hot-houses. The boxes placed in any ordinary cellar will produce them; and if placed in a stable, or any other building where the temperature is mild, they will be produced in considerable quantities. They have been cultivated in boxes, planted in the usual way, and placed in hot-houses, but are not found to answer so well as on beds of hot dung.

Substitutes for forced potatoes have also been had recourse to, and we know of none better than a small potato, about the size of a pigeon's egg, which is often imported into this country from Holland, by some of the Dutch residents in this country. The merits of this potato are, that the skin is very delicate, and the size that of a middling-sized forced potato, and is much superior to forced potatoes, which are usually used before they are ripe, and are therefore waxy and of an unpleasant taste; whereas this potato, being fully ripened, is mealy, and of a delightful flavor, in fact excelled by few of our finest potatoes, when grown in their greatest perfection. It is planted in the spring in the open garden, and treated exactly as other potatoes are, and when ripe in autumn is of the size above described. It is kept in heaps covered with straw, and afterwards with mould, as is usually done by our general crops of that root; and sometimes left in the ground

where it grew, and covered with litter to exclude the frost: in this case it is dug up fresh as wanted for the table. During winter and spring it is sent to table, and when washed the outer skin readily separates from a finer and close glossy inner skin, which must be carefully preserved in undergoing the necessary culinary operations of dressing. They should never be peeled, nor scraped with a knife, but only this outer skin removed by the finger and thumb while washing, or with an half-worn soft brush. Few can discover the deception, and often, when young potatoes from the hot-beds, and those described have been placed upon the table, the difference was not recognized until tasted, and the preference has been uniformly given to the Dutch sort.

It is particularly necessary to state, that this potato should be grown in a soil of a light sandy nature, resembling the natural soil of Holland as near as possible. In stiff strong clayey soils it does not succeed, neither in the quantity of crop nor quality of the roots. It is also a difficult matter to procure this potato genuine from Holland, the Dutch being not over particular in executing their orders with nicety, so far as regards sending the genuine article wanted. The cultivators of *bulbs* are not unacquainted with this fact. The most certain way is to employ some person resident there to purchase them on the spot, and export them to this country. Indeed, when a correspondent is residing in Holland, it is much the best way to have a few bushels imported annually for use. The seed tubers should be imported, if not annually, at least every second year, as they naturally degenerate when cultivated here for more than two years. The quality of the potato is so extremely delicate, that it soon becomes unfit for this important purpose, when grown in a cold, wet, or strong soil.

The late Dr. Noehden, in a communication to the Horticultural Society, gives the following method of preserving potatoes for winter use, as a substitute for young ones. Not that it is to be preferred to the use of the Dutch potato described above, but is deserving of being made known, as it may lead to some experiments upon this important subject. "By young potatoes," he says, "are generally understood those tubers which have not attained their full age and growth. In this

stage, the substance is generally finer grained, and more cohesive, than when they are farther advanced; they are what is called waxy, and differ in taste from those that are full grown. If they could be preserved in this state through the winter, for the use of the table, it would doubtless be an acquisition, and something of this kind I have seen attempted. When the general crop of potatoes was gathered, at the usual period of their harvest in autumn, the small tubers, which are frequently disregarded and left to their fate, were picked out and collected. They were deposited in a box, between layers of sand, and thus kept till December. At this time, the box being opened, they were found in perfect preservation, and fit to be dressed for the table. To give them all the appearance of young potatoes in a side dish, the tender skin on them was to be preserved, for peeling them would have destroyed that effect. It was recommended for that purpose, when they were to be used, to soak them previously for a certain number of hours, in water, and then to toss or shake them in a piece of rough flannel or baize, between two persons, backwards and forwards, or rub them between the hands; by which operation, the coarse outer covering is loosened, and the skin remains clean and delicate, so as to exhibit all the exterior of young growing potatoes. On trying them upon the table, I found that some had, really, the fine waxy taste of young potatoes; but that others, and perhaps the greater part, though resembling the former in size and looks, had entirely the grain and flavor of the old potatoes. That difference is, undoubtedly, to be ascribed to the different states of maturity, at which the one and the other had arrived. The mealy ones, although equally diminutive with the others, had, in fact, reached their full age, and possessed, accordingly, the qualities which that age would give. Those of a waxy texture were unquestionably much younger, and had not come to maturity when they were taken from the ground. They were in that condition, which, by the taste, determines the name of young potatoes. If this be so, (and every probability seems to attend the reasoning,) it may be concluded that it is feasible to preserve young potatoes in the manner described, if they be gathered young; but to distinguish those which are so in the common harvest, in au-

tumn, from those which only appear so, would be difficult. The idea, therefore, presents itself of planting potatoes expressly for that use, which must be done at a later period than this vegetable is generally planted, let us say two months later, in June instead of April.

"When the general crop is matured and gathered in October, those will be still in their young state, their grain will be still fine, and their texture close; and if thus taken up, and preserved, according to the method suggested, it can hardly be presumed that, when brought to the table in winter, they will be greatly different in quality from that when they were gathered. They will in every respect be young potatoes, probably not much inferior, if at all, to those raised on a hot-bed; for it does not appear that this mode of keeping them has any effect in promoting their maturity, at least not to any perceptible degree. The sand employed should be of as barren a nature as can be procured, and, if possible, contain little or nothing of the vegetable stimulus. When the tubers are taken out of the ground previously to their maturity, they will not readily sprout, or emit roots, which circumstance is a security for the success of the method in question."

Undoubtedly, by this late planting, waxy potatoes will be produced, because they are not fully ripe; but planting in June will not produce a crop of potatoes, at all similar in size or consistency, to be mistaken for young ones in winter. The laws of nature in this respect are curious: it is wonderful to see the exertions made by her to hurry forward, to overtake such of the children of her care, as may, either by accident or design, be detained behind their compeers. It is a well known fact, that many plants, natives of Alpine regions, spring up quite perfect in their structure, produce flowers and seeds, and mature the same in the short space of as many days, as the same species of plant, cultivated in our gardens, do in as many weeks. The practice, in some parts of England, is not to plant the general crops of potatoes till June, still they are far from being small, or like young forced potatoes.

Where potatoes are planted in frames or pits, sow thinly a little short-topped radish. They will come in for use before the potatoes will be injured by them, and will be making the

most of the bed. The seed should be sown in, as soon as the potatoes are planted; and if steeped for a few hours, previously to sowing, in milk-warm water, it will hasten the germination.

FORCING PEAS.

Few horticulturists have attempted to force this vegetable to any extent, or to produce it at any season much earlier, than that in which it ripens in the open borders, under the happiest circumstances; the rambling habit of this plant being probably the chief objection, as requiring more room than is generally found convenient to spare in our forcing compartments. They are, however, sometimes grown in the border of a peach-house, to a limited extent, and found to produce their fruit tolerably well; they are also found to succeed, by being sown in October, in pots or boxes, and transplanted into others at the time they are to be placed in that compartment. They may be cultivated in pits, planted in pots, and kept in a progressive temperature, according to their stages of growth, beginning at 40°, and rising gradually to 60°, at which temperature their blossom will set, and afterwards gradually risen to 65° or 70°, at which point they will ripen their fruit.

It is expected that the introduction to our gardens of Mr. D. Bishop's excellent dwarf early pea will give quite a new feature to the forcing of this vegetable, its diminutive habit and great earliness being extremely well calculated for growing in pits, or in pots in hot-houses. One important part in the cultivation of peas, even in the open borders, is their transplantation; and in any endeavour to accelerate them by artificial means in any forcing structure, it must be particularly attended to, as the most likely means of making them more prolific, as well as to prevent their running too much to straw. Air is important for their growth in any structure, and will prevent them likewise from being drawn too much to straw, as well as preventing the mildew, which, in a close moist atmosphere, would be extremely injurious to them. When the plants have attained a size, and are producing blossom, their

top shoots may be shortened, which will lessen their tendency to grow to straw, and bring forth additional sustenance towards the formation of pods.

FORCING BEANS.

Beans may also be forwarded by the same means as peas, although not generally practised; they will succeed better than any of the sorts of pea hitherto tried for that purpose. The early small Mazagan, the dwarf cluster, or fan, are the best kinds. The former should be topped, as is done in its general culture. The latter, from its humble growth, will not take up much room; both should be transplanted as directed for peas.

FORCING RADISHES.

In order to have radishes as early as possible, recourse must be had to the assistance of hot-bed frames, by which means they may be had in perfection from December till they can be procured from the natural ground. During winter, hot-beds of moderate dimensions should be put up of dung or leaves, about two feet high, just sufficient to promote the germination of the seeds, and to forward the plants moderately, without drawing them up slender, &c. When the bed is put up, cover it with about six or seven inches of light garden-mould, upon which sow the seeds, not too thick, but regularly over the bed. For a three-light frame, sow one light with the true short-topped early-frame radish, and the other two with red and white turnip-radishes for variety, keeping each sort separate. If the bed be formed of leaves alone, or of dung, which may not be wanted when this crop is off, a little lettuce-seed may be sown along with the radishes, which, if the former be carefully gathered for use, the lettuces will have a good chance to succeed them, and come in seasonably in spring. When the crop of radishes is gathered, the frame and lights will probably be wanted for other purposes. When they are removed, hoop the bed over with stout rods, and cover with mats at night, and in bad weather, until the young lettuce get strong. The seeds of the radish, from its nature, require to be buried much

deeper than that of the lettuce, therefore, in sowing, sow the radishes first, and slightly beat them down with the back of a spade, so as to dispose of the seed in as equal a manner as possible, as far as regards the depth. Cover them about an inch with some fine mould, either sprinkled over them with the spade, or sifted over them through a coarse rudder; then sow the lettuce-seed thinly, and cover it carefully about a quarter of an inch. Radishes succeed very well by sowing at this time a thin crop of salmon, or long-rooted radish, in one light; and the other two with turnip-rooted radish, as above, for the principal crop, and sowing regularly all over the bed a thin crop of the short-topped sort, which will come in before the others, and will be gathered for use before it injures the crop of the other sorts. In this case, no other sort of seed, such as lettuce, should be sown. When the plants appear, give them a large share of air, either by tilting up the lights in cold wet weather, or removing them for a few hours every fine day. After they have been up a few days, thin them regularly out, to admit of their having plenty of room to grow to their proper size, as well as to prevent them drawing too much, and spoiling each other. At this thinning, they should be left at about an inch square; when the heat begins to decline, let it be renewed, as occasion requires, with linings of hot dung or leaves; let water be given in such a quantity as the state of the bed and weather may require, observing to let the chill be taken off it first, by adding a sufficient proportion of hot water, or standing the water in pots in some of the hot-houses now at work. To keep up a regular succession of radishes at this season, if one bed be put up about the beginning of the month, let another be also got up by the end, or first week in February. At this season, young radish leaves are often used as an ingredient in salads, mixed with mustard, cress, &c.; where this is required, a bed should be put up every fortnight, and the young tops will be supplied from the thinnings of the plants, leaving still a sufficient crop to come to maturity on the beds.

The frames will require to be matted up at night, or otherwise covered, so as to guard against all accidents from frost, or the like.

FORCING MUSTARD AND CRESS.

Mustard and cress, unless when grown upon an extensive scale for the market, are seldom grown at this early season in hot-beds, as in most families, the consumption is so small that it would not repay the trouble and expense, unless grown in small frames of one light or two, together with rape and other salads, that are used in a very young state. Most gardeners find a supply more conveniently procured, where there are hot-houses, by sowing them in flat pans, boxes, or pots, and placing them over the flues, or on the footpaths of their forcing-houses.

These seeds soon vegetate in almost any temperature, and will arrive at perfection in any light soil. Rotten tan and vegetable mould are most generally used for this purpose, upon which the seeds are sown rather thickly, and sometimes covered with half an inch of the same sort of mould, or left uncovered; by the latter plan, they are less liable to be gritty, or have earthy particles mixed with them, which are not easily washed out. For this purpose, boxes about four or five inches deep, one foot broad, and of any convenient length are used, and answer many other purposes extremely well, such as propagating plants by cuttings, rearing tender annuals from seed, &c. These boxes are filled with any light mould, and placed over the flues, or in any convenient part of any of the forcing-houses. The seeds are sown in them, and watered; in a few days the salad is fit for use; one box of the above size sown with mustard, and another with cress, will produce enough for any ordinary family for three days. There should be a number of such boxes, two of them sown every third or fourth day during this month. If placed over the flues, in a stove or other house of high temperature, they will require plenty of water every day; but in houses of lower temperature, less water should be given, as they are apt to damp when too thickly sown, and kept over watered.

Where the consumption is great, or where there is not the convenience of hot-houses, these salads may be produced in hot-beds put up purposely of dung or leaves; a slight heat will produce them, but not so rapidly as when in a greater. Beds of two

feet high, covered with rotten tan or vegetable mould, or even fine sharp sand, to the depth of four or five inches, upon which sow the seeds thinly in rows across the bed, keeping each sort separately. As soon as the plants vegetate, give them plenty of air, and give water as occasion may require; but much less will be required in hot-beds than in hot-houses, for fear of the crop damping off. Along with them, may also be sown a little chervil (where wanted), rape, or any other salad-plants of like habits. Cover slightly at night with mats, or other covering when the weather is severe, but admit as much light as possible, by removing the covering early in the morning. In gathering the crop for use it should not be pulled, but cut neatly off with a sharp knife, holding the tops of the plants in one hand, and cutting them off about half their height with the other. They should be carefully washed, and placed in a clean salad-basket, but not allowed to remain in the water longer than necessary to clear them of any particles of mould that may be attached to them; neither should they be gathered long before using, as they will lose much of their flavor by the first, and soon lose their tenderness by the second mode. They should also be kept separate, and an equal portion of each sent from the garden.

FORCING CARROTS.

Carrots may be brought to early perfection by being sown on a hot-bed of dung, or leaves, any time this month. A mild temperature is only required, and a bed of two or two and a half feet will be found sufficient for this purpose. When formed to that height put on the frame, and when the heat is up, earth it over with some very light dry sandy loam, or vegetable mould, to the depth of seven or eight inches. If the seeds, previous to sowing, be well rubbed between the hands, with a mixture of sand or dry mould, it will cause them to separate more readily, as, from their singular construction, they are apt to stick closely attached, and therefore, without this precaution, would be difficult to sow regularly upon the bed. After being thus rubbed, they should be mixed with a portion of light dry mould, say three times their own bulk,

and in this state put into a large pot or box, and rendered rather damp by water, and then placed in a melon or cucumber-frame, or in any of the hot-houses at work. In a few days the seeds will have germinated, and when they are in this state, take them to the bed, which is supposed now to be ready for their reception; sow them carefully, and cover lightly with fine dry light mould, to the depth of a quarter of an inch. This promotion of the germination of the seeds will forward the crop considerably, and when the heat begins to decline, apply gentle linings. When the seeds are up, admit plenty of air, as already directed for mustard and cress, when the weather becomes mild enough not to injure them. By the end of February, or beginning of March, the frame and lights may be removed, and the beds covered at night, and in bad weather with canvas or mats, supported by means of hoops placed over the beds. The Early Horn and Altringham sorts are to be preferred for this purpose.

FORCING MINT, TANSEY, AND OTHER HERBS.

Mint, both for salads and mint sauce, will be wanted in most families. Tansey is not now so generally used as formerly, but still some families hold Tansey pudding in high repute, particularly in the north of England. For the purpose of having these plants in perfection in winter, and early in the spring, it is necessary to plant some of their roots upon a slight hot-bed of dung or leaves, protected by frames and lights. A bed of the same size as has been recommended for carrots, will be found perfectly sufficient for this purpose, upon which place six or eight inches of dry light mould of any sort, on which to place the roots pretty thickly together, so as to take up as little room as possible. When the roots are all placed in the frame, cover them with mould of the same description. Give water as occasion requires, and admit at all times plenty of air; by the middle or end of next month, the frames and lights may be removed, if wanted for other uses, and the plants protected by hooping the beds over, and covering with mats or canvas. When Tarragon is in request in a green state, it may be procured in the same manner; a three-light

frame will produce enough of all of these herbs for any ordinary family. When the crop is all gathered, or no longer wanted, the roots of the mint and tansey should be gathered up and thrown away, as by mixing with the mould or dung they would become troublesome weeds if dug into the ground; and as they are so easily procured, their loss will be of no consequence.

Mint may also be potted in large pots, and placed in any of the hot-houses at work, and four or six large pots will provide a supply for an ordinary family.

FORCING RHUBARB.

Rhubarb is found to be much improved in flavor by being blanched, as well as effecting a saving of sugar, in rendering it agreeable to the palate when dressed. In blanching rhubarb, the plant is more or less accelerated in its growth, and therefore may come under the denomination of being a forced vegetable. However, before the idea of blanching it occurred, or at least before it was put in practice, it had been forced in a variety of ways for many years. The agreeable acidity of the foot-stalks of the leaves, which are the parts used, together with their nearly approaching in flavor to gooseberries while in an unripe state, renders rhubarb an article of garden produce in much demand, at seasons when the other cannot be got, unless in a preserved state. Probably the medicinal properties of rhubarb may be beneficial to many constitutions, and may be admitted into the very small catalogue of pleasant medicines; but, without deciding that question, there are few tables at which rhubarb does not appear, in shape of tarts, during its season, which, in the open ground, is of short duration, in consequence of the extreme rapidity of its growth. To obviate this, and similar cases, has long been the anxious endeavour of the gardener; in few has he succeeded so completely as with the plant before us, and with so little trouble. According to the doctrine of Knight, rhubarb, like most other perennial herbaceous plants, contains within itself, during winter, all the organizable matter, which it expands in the formation of its flower-stalks and leaves, and requires neither food

nor light to enable it to produce either of them; all it requires are heat and moisture. If the roots of such plants be removed entire, as soon as their leaves become lifeless, they will be found to vegetate, after being placed in situations sufficiently warm and moist, as strongly and vigorously as if they had remained in their first position; but they will of course only continue to live to produce one crop of leaves, unless their leaves be allowed to perfect themselves under natural circumstances, to collect sufficient nutriment for the future demands of the plant; therefore we find rhubarb (as is also the case with asparagus and sea-kale) to produce those parts of their leaves, stalks, &c., which are used in culinary preparations in perfection, without their endeavouring to push out fresh roots to collect nourishment from the mould in which they are placed.

The roots of rhubarb dug up entire, at any period after the decay of the leaves of the preceding season, and carried into any forcing-house, there placed upon the surface of the borders in any convenient place, and supplied with plenty of water, will produce a reasonable quantity of leaf-stalks for use during the whole winter months; and by this simple means, we can obtain this desirable esculent from the end of November till it comes in again in the open ground.

In removing these roots, it must be done with as large balls of earth as convenient, not that they require the earth to nourish them, but it is the means of equalizing the degree of temperature and moisture round their roots, and prevents them from being dried up by the action of the air. They may readily be blanched in any situation, by covering them with mats, supported by hoops or large pots, such as are used for sea-kale, only larger, or in default of these, boxes may be placed over them, so as to exclude the light; or they may be equally cultivated by placing the roots upon the surface of a pit or common frame, formed of hot dung or leaves, and covered with wooden sashes, or the glasses put on, and kept closely covered with mats or soft hay, straw, or any other light material. The roots placed in a cellar, or any other spare house, when the temperature can be kept a little above that of the open air, will be found to produce a good crop, and come in before that in the open ground. Rhubarb may also be successfully forced

at any season after November, in the ground, where it is grown for a general crop, by placing deep boxes over the roots, and covering them with hot dung or leaves, as is usually practised for sea-kale. By this means, it can be had all winter, where there is not the convenience of a hot-house or vinery, in which to place it, but of course it will be attended with a little more trouble. The boxes for this purpose should be made of half-inch boards, and jointed close, so as to exclude the rank steam of the dung from getting in to the young shoots.

Knight has practised forcing this vegetable with success, by digging up the roots of young plants early in winter, and placing them in large and deep pots, each pot being made to receive as many as it would contain. Some fine sandy loam was then washed in to fill entirely the interstices between the roots, the tops of which were so placed as to be level with, and about an inch below the top of the pot. These pots were covered with others of the same size inverted upon them. They were then placed in a situation in the vinery, where nothing else would prosper being so much shaded; there, they were copiously supplied with water, the plants vegetated strongly, and from each pot he was enabled to obtain three successive crops; the leaf-stalks of the two first crops being crowded so closely as nearly to touch each other over the whole surface of the pots. As soon as the third crop of leaves was broken off, and a change of roots became necessary, those were removed from the pots, and a fresh supply put in. The roots that produced the said crop were planted out in the open ground, their tops being covered about an inch with mould, and he conjectures, that they will, after a year's rest, be fit to be brought into forcing at a future period. Should they, however, perish, he adds, it will be of very little consequence, as year-old roots raised from cuttings of the roots, or even from seeds sown in autumn, will be found sufficiently strong for use. We are, however, of opinion, that plants from four years' old and upwards are much better for general crops; but, for Mr. Knight's plan, the younger ones are certainly to be preferred.

FORCING DANDELION.

This plant, being indigenous to our road-sides, and waste sides of fields, &c., has seldom been cultivated, even although it is found in considerable quantities on the stalls in Covent Garden Market. It is not however difficult, nor yet unworthy of culture as a salad-herb, but is also worthy of being forced at mid-winter, when other salads are scarce, and it is then held in much esteem; it has a pleasant bitterness of taste, and is considered a good stomachic.

We have forced this plant for some years; for which purpose prepare a slight hot-bed, of such dimensions as have been recommended for carrots, or mustard and cress, upon which place six or seven inches of mould of any sort, provided it be dry, into which to plant the roots, which generally will not be difficult to procure. The roots should not be planted deep; about one-third of their length should be above the mould; as the heat gets up, and before the plants begin to spring, cover the whole over with saw-dust, quite dry, up to the level of the tops of the plants, observing to water the roots previously to laying on the saw-dust, that it may be kept as long dry as possible. As the plants shoot up, which they will begin to do in a few days after planting, let them be regularly covered with more saw-dust, the drier the better; continue this method until they have attained the height of four or five inches. When they are fit for use, they should be carefully cut, taking a thin slice off the top of the crown of the root to keep the leaves better together; in this way, after being carefully washed, they are sent to table, where they are eaten, either by themselves or mixed with other salads. Where saw-dust is not to be conveniently procured, rotten tan sifted and kept dry for the purpose will answer equally well. The leaves of this salad are not only used, but the roots also, which, when washed clean, are sent to table, sometimes attached to the leaves, and often separated from them. To those fond of a variety of salads, this will present a valuable addition. The French eat the roots and leaves between thin slices of bread and butter.

FORCING SEA-KALE.

Few vegetables are improved more by cultivation than the sea-kale, and few are more improved by forcing. In its cultivated state, it is found to be in April and May, far superior to what it is in its natural habitats; but, when forced at mid-winter, it is superior to any other vegetable with which we are yet acquainted. Possessing such merits, it is not surprising that many methods have been tried to bring it to perfection, and to protract the season of it to the utmost possible extent.

The most general way of forcing sea-kale is, by planting it upon the beds or rows in which it grows in the natural ground; for which purpose, (the leaves and stems of the plants being trimmed,) the surface of the beds or rows is forked up carefully, so as not to injure the roots; the whole is then covered with finely sifted coal-ashes, over each plant is then placed a large flower-pot inverted, with the holes stopped to prevent the admission of steam, or regular blanching-pots are placed over them in the same manner; previous to this, there should be a quantity of dung or leaves put up to ferment, and which, after being turned over once or twice, are fit for use. These pots are to be covered with this dung or leaves to the thickness of a foot or eighteen inches, according to the state of the weather and quality of the dung. While the operation of covering the pots is going on, beat the dung regularly down, as it is laid up, to make the whole as compact as can be; when finished, it should have a ridge-like appearance, for the better throwing off the rain or melting snow. Great care must be taken not to make this ridge too large, so as to produce a superabundance of heat; this must be carefully guarded against, for it is better that the temperature be too low, than too high, during the whole process. In the first case, no harm can ensue to the crop, only that it will not come into use so soon; but the latter may be attended with much danger to the plants, and will always produce them weak and ill-flavored. The pots should be so placed, that a portion of the coal-ashes may be gathered round the base of them, to prevent the entrance of steam, which would destroy the crop if admitted in any quantity. The heat during the whole process of forcing should

be kept up above 50°, and not allowed to exceed 60°, and in about three weeks after covering up, the crop will be fit for use. When the ridge of dung is finished, thrust in two or three watch-sticks, by which the temperature can be at any time ascertained. It is seldom necessary to add to the ridge of dung, unless the weather should be extremely cold and windy; and the same dung used to force one set of roots, with the addition of a small quantity of fresh added, will be in a fit state to place over a second set of roots, and so on, during the forcing season, rejecting such as become too much decayed. As the crop is gathered, and no appearance of more shoots springing, the plants are then to be allowed to rest till spring; but to protect them from the injury of frost, leave a few inches of the rotten parts of the dung over them. In spring they will shoot up and perfect leaves, so as to fit themselves for forcing again in the same manner the following season. One set of roots will last in good condition for forcing, in this way, for many years; however, as they will become eventually large, and spread their crowns to a breadth, not to be conveniently covered with the blanching-pots, new plantations should be made every third or fourth year; this will allow of a succession of fresh roots for forcing, and as the oldest are destroyed, will thus afford a piece of ground fit for any crop to follow.

Sea-kale is also forced on hot-beds, exactly as is already described for asparagus, and is blanched by keeping the lights covered with mats or straw; or in want of lights, wooden shutters are made so as to fill the spaces of the lights; by this method the roots are, of course, of no use after the crop is gathered. In placing the roots into a frame for this purpose, it is necessary to cut away all the superfluous large roots, and leave only such as have buds at their extremity. If each piece having a bud be separated from the rest of the root, and be eight or twelve inches in length, it will be found, under good management, to produce as good a crop as if the whole mass of roots were retained. By thus reducing the roots, a greater number will be got into one frame, and each of these parts of the root will be found to contain sufficient organizable matter to perfect the crop. After the same manner, the roots may be

placed in any forcing-house now at work, either in large pots planted in light mould and sufficiently watered, and blanched by inverting another pot of like dimensions over them; or they may be planted in the borders, and blanched by covering with the proper blanching-pots. In either case, as they require little air and no light, any situation in the house, such as behind the flues, or in any other place where no other plant can live, will be found a suitable place for them. We would recommend the following method for forcing this esteemed vegetable, as being decidedly the neatest of any method that we have seen practised. The experience of several years, during which we adopted that method, convinces us of its superiority. The expense, in the first instance, is more than that of any of the methods in general practice, but the neatness of the beds, both while they are forcing, and while they are resting, will be sufficient to compensate for the expense, where neatness is combined with utility. In forming the beds, which should be rather above the general level of the surface, particularly if the soil be strong and wet, proceed by building parallel walls of open brick-work (or what is generally understood by dove-cot work, such as is used in the building of cucumber and melon-pits) of any length the beds are to be made, and at two feet distant from each other, not including the thickness of the walls, which for durability should be nine inches thick, that is, the thickness of the length of one brick, or they may be only four inches thick, which will answer the purpose equally well, but will not last so long. These walls should be three feet high, say two feet under the surface, and one foot above it. The mould, previously to the walls being built, should be excavated to the depth of two feet. When the walls are built, every second space should be filled up with rich light mould, having a good proportion of sand in it, about nine inches above the level of the tops of the walls, to allow for settling, in which to plant the plants, which should be chosen out of some one-year-old plants, being strong and well-rooted; and which should be carefully planted in March or April. They should be well supplied with water during the first season, and the surface of the beds kept covered a few inches with rotten dung, both to enrich the plants, as well as to prevent

the drought from checking their growth during summer. If well attended to in this respect, they will be in pretty good state for slight forcing the first season after planting, and will be completely so the second, and will continue so for several years. The tops of the walls should be secured by having a wooden plate, by way of coping, both to resist the wet and render the bricks less liable to be displaced. The spaces left empty are intended to be filled with dung, or leaves, or any other fermentable matter, the heat from which will penetrate through the open brick-work in the walls sufficiently to warm the roots in the beds; but as that heat would not, in the middle of winter, be powerful enough to accelerate vegetation sufficiently fast, a provision is made which will prevent the escape of the heat of the linings, and at the same time blanch the crop and keep the whole dry, by having covers constructed of wood, which should rest upon every fourth wall, so as to include two beds of plants, and one lining only, which lining should be made of well-fermented dung or leaves, so as to produce as little steam as possible; but, in order to guard more effectually against any accident of that kind, the lining so enclosed should be covered with rotten tan, or dry light mould, sufficiently to keep down the steam, if too powerful; and in the top of the wooden cover should be two, three, or more small ventilators, according to the length of the beds, four inches square, which can be opened and shut at pleasure, both for the escape of any superfluous steam, as well as for the examination of the progress of the crop and state of the beds. Steam, if not too powerful, will not injure the crop, and we have never had one instance of any accident arising from that cause. Every alternate lining will be on the outside of the wooden frame or roof, and can be turned over, watered, or more fresh dung or leaves added, according to circumstances, and may be made up to any height required. When the crop is fit to gather, remove one of the boards on the side of the frame, which for this purpose is left moveable, being hinged to the other parts of the frame; when one bed is cut, proceed in the same manner to the opposite side, and remove the moveable board there. We have sometimes covered the beds nine inches or a foot over with rotten tan, and some-

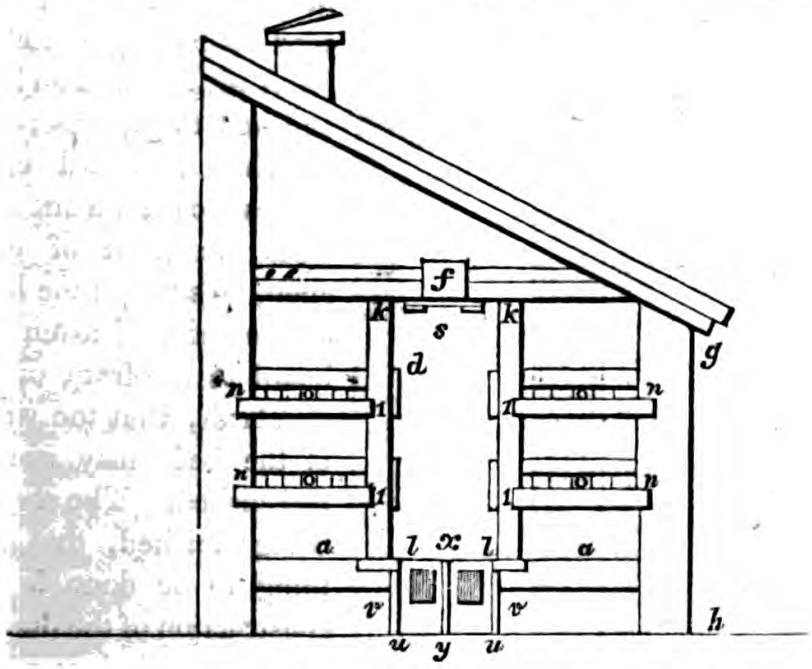
times with saw-dust; in such cases, the enclosed lining was left uncovered, as the steam proceeding from it could not injure the crop; by this method we gained more heat, but the state of the crop was not so readily ascertained as by the other method. Rhubarb, when required to be blanched, may be managed exactly in the same way; but where there is the convenience of forcing-houses at work at this season, it is not worth the expense and trouble. The covers should not be so high as to form too large a space under them to be heated; if eighteen inches in their highest part, it will be amply sufficient.

FORCING MUSHROOMS.

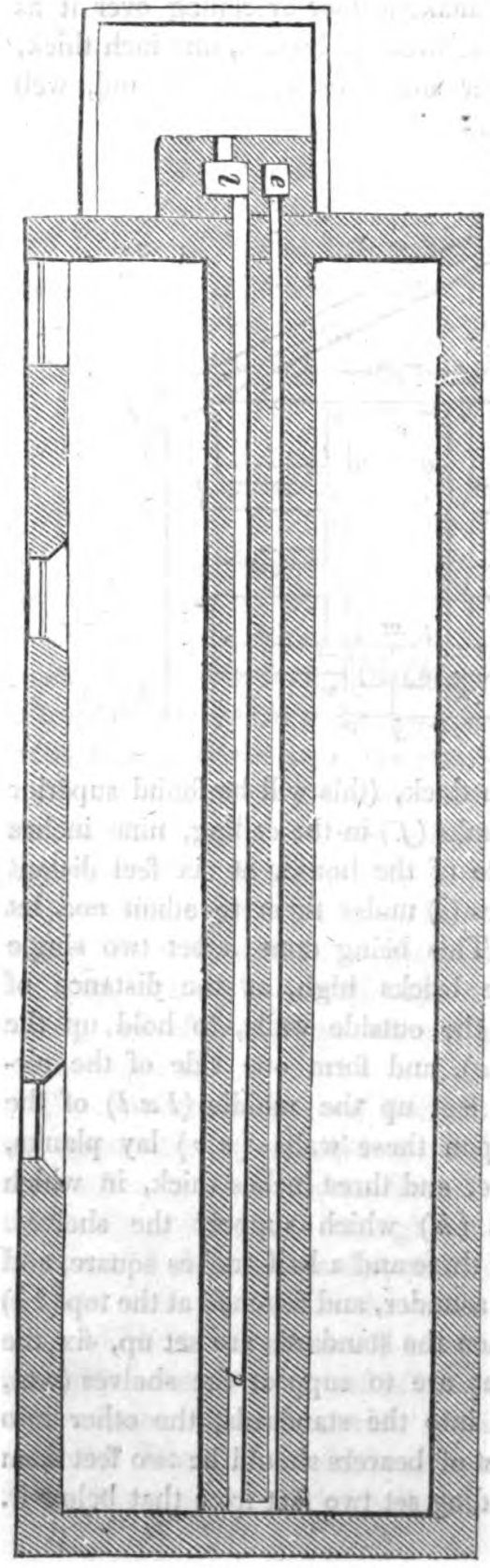
Where mushrooms are required all the year, they cannot be had without some degree of artificial heat, and therefore may come under the head of forced vegetables. The most successful and convenient method of producing this vegetable during winter is decidedly that introduced by Mr. Isaac Oldacre late gardener to Lady Banks. It is the common method of cultivating mushrooms in Germany, and by him introduced into Russia, during the time he was one of the gardeners to the late Emperor. It was subsequently adopted by him at Spring Grove, and now, with slight variations, almost universally practised throughout the British gardens. The house in which the mushrooms are grown may either be a detached building, or may be erected behind a pine-stove, or other hot-house, and of dimensions according to the quantity of mushrooms required.

The mushroom-house of Oldacre, of which the accompanying figures are representations, is described by him in a communication to the London Hort. Soc. as follows: "The outside walls (*g h*) should be eight and a half feet high for four heights of beds, and six feet and a half for three heights, and ten feet wide withinside the walls. This is the most convenient width, as it admits of a set of shelves three feet and a half wide on each side, and affords a space through the middle of the house three feet wide for a double flue, and to walk upon it. The wall should be nine inches thick, and the length of the house as it may be judged necessary. When the out-

side of the house is built, make a floor or ceiling over it as high as the top of the outside walls of boards, one inch thick, and plaster it on the upper side (*e e*) with road sand, well



wrought together, one inch thick, (this will be found superior to lime), leaving square trunks (*f*) in the ceiling, nine inches in diameter, up the middle of the house, at six feet distant from each other, with slides (*s*) under them to admit and let off air when necessary. This being done, erect two single brick-walls (*v v*), each five bricks high, at the distance of five feet and a half from the outside walls, to hold up the sides of the floor-beds (*a a*), and form one side of the air-flues (*u u*), leaving three feet up the middle (*l x l*) of the house for the flues. Upon these walls (*v v*) lay planks, four and a half inches wide, and three inches thick, in which to mortise the standards (*k*) which support the shelves. These standards should be three and a half inches square, and placed four feet six inches asunder, and fastened at the top (*k k*) through the ceiling. When the standards are set up, fix the cross-bearers (1 *n*, 1 *n*) that are to support the shelves (o o), mortising one end of each into the standards, the other into the walls (*n*). The first set of bearers should be two feet from the floor, and each succeeding set two feet from that below it.



Having thus fixed the uprights (*k k*) and bearers (1 *n*) at such a height as the building will admit, proceed to form the shelves (o, o) with boards an inch and half thick, observing to place a board eight inches broad, and one inch thick, in front of each shelf, to support the front of the beds. Fasten this board to the front of the standards, that the width of the beds may not be diminished. The shelves being finished, the next thing to be done is the construction of the flue (*p*) in the ground plan, which should commence at the end (*l*) of the house next to the door, run parallel to the shelves the whole length of the house, and return to the fire-place, where the chimney should be built. The sides of the flue inside to be the height of four bricks laid flatways, and six inches wide, which will make the width of the flues fifteen inches from outside to outside, and leave a cavity on each side betwixt the flue and the walls that are under the shelves, and one (*x y*) up the middle,

betwixt the flues, two inches wide, to admit the heat into the house from the sides of the flues. The middle cavity (*x y*) should be covered with tiles, leaving a space of one inch betwixt each tile for the admission of the heat. The top of the flues, including the covering, should not be higher than the top of the brick walls that form the front of the floor-beds. The reason why the sides of the flues are recommended to be built stronger than usual is, because they support the walk. The walk itself is formed by three rows of tiles, the outside rows making the covering of the flues, and those of the centre one covering the middle cavity (*x*, *y*) as above-mentioned. The outside cavities of the flue are left open, the tiles which are placed over the flues being laid so as not to cover these cavities, which allow the heat of the sides of the flues to ascend."

The house being constructed, the beds are to be made in the following manner:—

At any season of the year "collect a quantity of fresh horse-dung, that has not been exposed to wet or fermentation, clear it of long straw, so as to leave one-fourth in quantity of the shortest litter, when incorporated with the horse-droppings; *then* add a fourth part of tolerably dry turf-mould, or rather maiden earth, and mix it well with the dung before mentioned; the advantage derived from mould, or maiden earth, is the union of the whole into one compact solid substance, so congenial to the growth of mushrooms. If dung, from the rides of a livery stable, or the round of a horse-mill can be procured, and mixed with a fourth part of short litter, and added to as many horse-droppings as will cause a gentle warmth when made into beds, it will be found superior for the production of mushrooms to horse-dung that is gathered from the stables." This being procured in some quantity, proceed to make up the beds in the following manner: "Form the beds on the shelves and ground-floor, by placing a layer, about three inches thick, of the prepared mixture, then with a flat mallet beat it as closely together as possible; next add another layer of the compost, repeating the same process as before, and so until the beds be formed into a solid body seven inches thick, making the surface of the beds as smooth and as

even as possible. The reducing the beds into a very solid body is a most essential point, for without it, you cannot expect success, and the thickness of them must also be particularly attended to, for where there is a much greater body, the beds will be subjected to a strong fermentation, and will be prevented by evaporation, from retaining that consistency in the dung which is absolutely necessary for the production of a good and plentiful crop. On the contrary, if a much less quantity be laid together, the heat and fermentation will be insufficient to prepare the beds for the nourishment of the spawn; but the assistance of both, to the extent prescribed, cements the materials, which, in addition to beating, increases greatly their solidity. The proper vegetation of the spawn, and the consequent crop of mushrooms, depend entirely upon a moderate genial heat and fermentation, neither too strong nor too slight. As soon as the heat in the beds is a little more than that of milk from the cow, (say from eighty to ninety degrees of Fahrenheit,) beat the beds a second time, to render them, if possible, more solid; then make holes with a dibble three inches in diameter, and nine inches asunder, through the compost in every part of the beds. These holes will be the means of cooling the beds, and preventing that excess of heat from taking place, which would produce rottenness and render them unproductive. If the beds do not attain the heat required in four or five days after putting up, (which may be known by plunging a thermometer into one of the holes), add another layer of the compost two inches thick, which will probably increase the heat sufficiently; if not, a part of the bed should be taken away, and the remainder mixed with fresh horse-droppings, and wrought together in the same manner as before, in order to produce the proper degree of heat. Beds made after this manner readily generate natural spawn in summer, and frequently in the winter months."

SPAWNING THE BEDS.

"In three or four days after the holes have been made, by observing the thermometer it will be found that the desired degree of heat has been obtained, and the inside of the holes

will also have become dry: the beds are then in a good state for spawning, which should be done while the heat is on the decline. If this operation be deferred until the heat be quite exhausted, the crop will be late and less plentiful. Fill every hole with spawn, which should be well beaten into them, and then make the surface of the beds solid and level. It is of no consequence whether the spawn put into the holes be in one lump, or in several pieces, it is only necessary that the holes should be well filled. About a fortnight after the spawn has been introduced, examine the holes, and if the spawn has suffered any damage from over-heat or too much moisture in the beds, introduce fresh spawn in the same way as before. On the contrary, if the spawn be found good and vegetating freely into the compost, such beds (if required for immediate production) may be covered with mould, agreeably to the rules hereafter laid down, and the beds intended for succession should remain unearthed, in the summer, three weeks or a month, before you wish them to produce; and in winter a month or five weeks. If the spawn be introduced in hot weather, air must be admitted, as freely as possible, into the shed, until the spawn has spread itself through the beds; for if the place be kept too close, the beds will become soft and spongy, and then the crop will neither be abundant nor of good quality. Such beds as are intended to be put into work must be covered with a coat of rich maiden earth, in which its turf is well reduced. Then spread it regularly over the surface of each bed, two inches thick, and beat it as solid and level as possible. The earth used should neither be too wet nor too dry, but so as to become compact, and exhibit when beaten a smooth face. If too moist, it will chill the beds and injure the spawn. On the contrary, if too dry, it will remain loose, and in a state by no means favorable to the growth of the mushrooms; but when solid, it produces not only finer mushrooms but in greater quantities, as the earth from soils of lighter texture invariably grows them weaker, and of inferior quality, and such beds cease bearing much earlier. From the time of covering with earth, the room or shed should be kept at 50° or 55°, and the light must be excluded. If the heat

be suffered to exceed to any considerable degree, it will cause the beds to ferment a second time, and weaken, if not totally destroy the spawn; but should a much lower degree of temperature than the one prescribed be permitted to prevail, the mushrooms will advance slowly in their growth, and if watered in that state, numbers of the small ones will be prevented from attaining perfection. In watering them, extreme caution is necessary, as well in the mode of application as in the temperature of the water, which should be nearly as warm as new milk, and very lightly sprinkled with a syringe, or a small watering-pot, otherwise the mushrooms are sure to sustain damage. If cold water be used, and given plentifully at one time, it will not only destroy the existing crop, but the spawn also, and render the beds so treated of no farther utility. If the beds have been suffered to become very dry, it is better to give them several light waterings, than one heavy supply. In gathering the mushrooms, great care must be taken not to disturb the small ones, which invariably, with good management, surround the stems of those that are more early matured. The best method is to twist them up very gently, in all instances, where you can, but where you are obliged to cut them, great care should be taken to divest the beds of the stems of those which are cut, as they would rot, to the great injury of those that surround them. If the preceding directions be properly attended to in the management of the beds, they will continue to bear for several months, and a constant supply may be kept up by earthing up one bed or more every two or three months, according to the quantity of mushrooms required at one season. When the beds are in full bearing, if the mushrooms become long in their stems and weak, it is certain that the temperature is too high, consequently air must be admitted in proportion to the heat. As the old beds decline in bearing, and produce but few mushrooms, take the earth clean off the dung, and if you find the litter decayed, destroy the beds and replace them by new ones, being careful to select any good spawn that may present itself; but if, on taking away the earth, you find the beds dry, solid, and full of good spawn, add a layer of fresh compost, as before recommended,

three or four inches thick, mixing it a little with the old, and beat it as before. By adhering to this mode of renovating the old beds, a continual supply may be kept up."

It must be acknowledged that mushrooms produced in this way are far inferior in flavor and juicyness to such as are produced upon beds in the ordinary way, and which is fully described in the Culinary Garden; still the above method possesses one decided advantage over the other methods of cultivating this precarious vegetable, which is, that they are produced with much less trouble and expense in winter, and with much more certainty. Mushrooms are invariably found to be finer flavored, more juicy, and heavier, when cultivated upon beds of considerable depth. Hence it would appear that they require nourishment, to a considerable extent, and that nourishment seems to be derived from the quantity of proper materials with which the beds are composed. Where there is a greater body of matter contained in the beds constructed as above, the mushrooms are found to increase in size, therefore it becomes obvious that, instead of the beds being only seven or eight inches deep, if they be from a foot to fifteen inches, the crop would be benefited thereby. In making them up to this thickness, great care ought to be taken to prevent any unnecessary fermentation. The droppings should be partially dried before using, and the heat allowed to exhaust itself nearly in one course of compost, before another is laid upon it. As the proper degree of temperature and solidity is of the utmost importance, beds made of the above thickness will retain their temperature longer, and will be less subject to the changes of moisture to which the German beds are liable, owing to their want of sufficient thickness. We have, however, thought it advisable to make the above long extract from the Hort. Trans. as being the ground plan of the most regular method of cultivating mushrooms yet published. The success of the plan, under the management of the intelligent individual who introduced it, we have frequently witnessed, as well as practised ourselves; but have always found that an increase of body in the beds was attended with the most success, and less attention required after the fermentation had subsided.

Mushrooms may also be readily obtained throughout winter, in any moderately warm apartment, by filling boxes, or hampers, or any other thing that will keep the compost together. The compost, the same as for the beds already described, should be well beaten into them, and spawned when the rank heat is upon the decline; any number of boxes or hampers may be filled with it, and kept in reserve until wanted in any dry shed or loft, where there is no chance of wet or frost penetrating. When it is thought necessary to put them to work, take any number of them and mould them over as above directed, and place them in any temperature, not exceeding 60°; by occasionally giving a slight watering, so as to keep the materials in an equable degree of moisture, plenty of mushrooms will be produced. Boxes thus filled may be placed in any of the forcing-houses, where the temperature is not too high; and, as the crops become scanty and weak, remove them again to the loft or shed, from which they were at first taken; and then, after resting for a few weeks, may be brought into the house again, and if not too much exhausted by the first crop, will produce a second, and sometimes a third crop, during the winter months. Having a sufficient number of boxes, a regular supply may be thus kept up, with little trouble or expense.

FEBRUARY.

SUCCESSION AND NURSING PINE-PLANTS.

The general management of both these divisions of the pinery are, at this period of the year so similar, that it may be sufficient for us to say, that the temperature of both should be kept up to the same as directed last month, and that air and water should now be more liberally given. No opportunity of good weather should be lost sight of at this season, when air can be given, which will strengthen the plants, and prevent them drawing up weak, and assuming a sickly yellow color, which they are apt to do when long shut up in a close atmosphere.

Healthy plants will now be beginning to make roots, and therefore should be supplied with water once every six or eight days, or rather as often as they appear to be dry. We have already more than once alluded to the mistaken practice of watering at stated periods; no such plan should ever be pursued, as some plants require water often, and others more seldom, even in the same pit, this depending generally upon the healthy or unhealthy state of the plants.

FRUITING PINE-PLANTS.

It may be found necessary, about the beginning or towards the middle of the month, to turn over the bark or leaf-bed, the heat having probably declined considerably; and it may also be necessary to add a portion of fresh tan, or leaves, to set the whole in a state of fermentation again. In adding fresh bark or leaves, it should be always observed to trench the bed up from the bottom; and in mixing the materials, care must be taken to keep the fresh matter next the bottom, or at least not near the top; a sufficient quantity of the old half-decayed matter should be brought up to the surface, in which to plunge the pots. The plants should be examined

when taken out of the bed, to see if any of them require shifting. This should not be done as a matter of course, but as a matter of necessity. Those which appear stinted for room in the pots should be carefully taken out and repotted into larger pots, without disturbing the ball but as little as possible. If the ball seem hard, and the mould appears exhausted, loosen the surface of the ball carefully, by gently patting it all round with the hand, but if too hard to be thus easily broken, it has the more need of being shifted; in such cases, as much of the outer sides of the ball should be displaced, so as not to shake it quite to the centre, and the roots carefully separated, and such as are injured in the operation, or decayed, should be thinned out with a knife. A larger pot should be prepared by being previously well drained, and the plant thus treated potted in it, carefully spreading out the roots, and shaking the mould in among them, but not using a stick, as is often practised, by which the roots may be injured. The plant thus repotted should be placed rather deeper in the pot than it was in the former, and if any useless or decayed leaves remained about the bottom of the stem, they should be displaced, thus affording an opportunity for fresh roots emitting themselves near the surface of the mould. After potting, a moderate supply of water should be given, to settle the mould about the roots. Those plants which appear healthy, and are judged to be in pots sufficiently large, should not be disturbed, as it is presumed that they have been all potted in autumn in full-sized pots, in which they are to perfect their fruit. Nothing can be gained by repotting plants at this stage of their growth, most of them starting into fruit, and many of them already farther advanced. The act of shaking them out of their pots at this time must certainly give them a check that they will not get over for some weeks, and will be evidently detrimental to the formation of the fruit, which will be now in an embryo state. Those plants which appear sickly, and do not stand steady in the pots, may require to be taken out, and the whole of the ball carefully broken; the roots should then be examined, and such as are decayed should be displaced, and the plant repotted into the same sized pot; or, if very sickly, into a smaller pot than that in which it was first placed, which, when the plant

is recovered and fully established, will be potted into a larger pot at a future examination. All the plants which seem in good health, and are in sufficiently large pots, should not be disturbed, only a little of the surface-mould gently loosened and taken off, and fresh surfaced with mould. Those plants which may have already started into fruit, and appear to be in want of room for their roots, should be carefully turned out of their pots and placed in larger, taking every possible care not to break their balls nor disturb their roots. When all the plants are carefully examined, and the bed again ready for their reception, which operation should be going on while the plants are examining, so as to keep them out of the bed as short a time as possible, they should again be replunged up to the brims of the pots, unless it be apprehended that the heat will be too powerful in the bed; if that be apprehended, plunge them only three-fourths of their depth at first, and after the heat declines, either plunge them to their full depth, or add a top-dressing of half-decayed tan or leaves from some of the other departments where it can be spared, or have some prepared for the purpose. It is, however, much better to plunge them to their full depth at first, as moving them so often about is detrimental to them, and the less they are now disturbed until their fruit be swelled off, the better. In plunging them, care must be taken to place the pots quite level, so that they will hold their share of water, and the plants stand perpendicularly to each other. To facilitate this, a trench should be formed out in the bed the whole of its length, the pots placed in it at regular distances from each other, and the tan, or leaves, firmly packed in all round. The distance at which they should stand from each other must be determined on by the size of the plants; they should not be closer, at all events, than twenty or two-and-twenty inches from the centre of one plant to that of the next.

In arranging the plants in the bed, the largest should occupy the backward row, that is, the row farthest from the front of the house, and the tallest plant should stand in the centre of this row; the next in order of height upon the right hand, and left alternately, and so of the other rows until the whole be plunged, the smallest plants occupying the front row,

or that next the front of the house. It sometimes, however, happens, that a few plants may be much farther advanced than others, and may be upon the eve of attaining maturity; such may be placed at the ends of the rows, at that end of the bed next to where the flues enter the house, and will thus be forwarded into maturity, it being supposed to be the warmest part of the house, and, by placing them there, it will not cause a break in the arrangement of the stock, when they are removed after being ripe; their place can be filled with such plants, from the succession-house, as will fill up the space. Should it so happen, that their being so placed will forward their fruit sooner than may be desired, they may, in that case, be placed at the other end of the bed, which is supposed to be the coldest part of the house, and by that means be retarded; or they may be at once placed in the succession-house, where the temperature is much less than in the fruiting-house. It would, however, be inconvenient to place them, perhaps, in the centre of the bed, where, from their height, they probably ought to stand; for, when cut and removed, the space which they occupied could not be filled without endangering those around them.

When they are all placed in the bed, they should have a little water at their roots, and a gentle syringing all over-head, to wash off any filth or dust that may have fallen upon them during the regulation of the bed. This syringing should now, as the season advances, be more frequently and more copiously administered to them. The temperature now, until the heat of the bed rise sufficiently, should be kept up by fire-heat to 64° or 68°; this, however, will be in a few days again sufficiently increased. The thermometer then should be allowed to rise to 70° or 74°, and continue increasing from that to 75° or 78°, keeping the temperature as near to that point as possible.

Air must now be freely admitted every day that the state of the weather will admit, so as to prevent the thermometer exceeding 83° or 84°. When the weather is so inclement as not to allow of a sufficient share of fresh air being given, let the fires be kept up during the day, so that the air may be admitted without lowering the temperature of the house below

75° or 78°. Whether the houses be ventilated by proper ventilators in the walls, or by the opening of part of the lights, it will, in frosty days, be advisable to hang a thin mat opposite the aperture, to temperate the current of air. When the house is closed for the night, let plenty of water be spilt upon the floors and flues to produce a plentiful steam; this should be attended to regularly every night; and, in fine clear weather, a little fire should be made in the morning early, to heat the flues just sufficient to produce a like effect. If the bed should get rather warm, but not so as to render necessary a removal of the plants, give plenty of water to the roots; if this be attended to, there is little to be apprehended from their being injured by a rather brisk heat at this season. The heat of the bed can always be ascertained by keeping watch-sticks thrust into it at or near the ends, and towards the middle, which an experienced person will ascertain by pulling out the sticks, and feeling the heat of them by the hand; but the most accurate mode, of course, is to plunge the bulb of a thermometer into the bed to the depth of the bottom of the pots, the heat then will be thereby ascertained to a sufficient nicety, which should now be not less than 80° at the bottom of the pots, or if it be 90° no harm will ensue.

FORCING PEACHES.

The peach-house being put in order, as directed last month, the trees pruned and tied, the flues cleaned, and the borders forked up and watered with liquid manure, the lights should now be finally shut up, and only opened to admit air as necessity may require. This should be admitted in large portions while the buds are swelling, and until the blossom begins to expand, no harm can come over them by a free admission of this necessary agent, provided that the temperature be not allowed to fall too low; and if frost be excluded, the slower that the sap is put into motion, the stronger will the buds break, and the blossom will, consequently, be stronger: the wood-buds will also push with greater regularity and strength. The temperature should not be allowed to exceed 45° for the first part of the month, but be kept as near that point as possible by the admission of air. Towards the middle of the

month it should be gradually raised to 50°, and by the end of the month to 52°. The regular keeping of this temperature is of the utmost importance to the welfare of the trees, as well as to ensure a crop of fruit. The times of regulation being at six or seven o'clock in the morning, and eight or nine at night. Until the blossom begins to expand, the trees should be syringed every morning about nine, and every evening about four or five, when the house is shut up for the night. Water should be poured upon the flues at the time that they are sufficiently warm, for the purpose of producing a steam, but this will not be often the case, unless near the entrance of the flue from the furnace for some time; however, as soon as the flues are sufficiently heated to keep up the required temperature, this steaming should be attended to every morning and evening. The borders should be kept moderately moist by watering, particularly round the flues and where they enter the house, being more apt to become dry there than at a greater distance from the heat. Great caution must be paid that the temperature of the house be not allowed to exceed the points above, for if heated to a high temperature, and then allowed to fall to a lower, the buds would not only push weakly, but would absolutely fall off. Although we have advised syringing both mornings and evenings, it is not to be done in a careless nor immoderate manner, but should be done with the finest rose upon the syringe, to act as a dew upon the branches and buds, to soften them, and to render their breaking more regular. The syringe best suited for this purpose is that of ***Reid's Patent Syringe,*** which can be purchased of any nurseryman or respectable ironmonger. If the garden-engine be used, or any of the coarser syringes commonly in use, too much water will be spilt upon the borders of the house, which should not be deluged with wet, but only kept moderately damp. If the borders be kept too wet, much danger will be incurred of the buds falling off before they expand, and consequently a failure must ensue.

Peaches have been forced by means of dung-heat in this country, extensively at Dagenham Park, and are also forced by dung in Denmark and Holland, but we do not think that the practice merits general adoption.

FORCING VINES.

The vinery being put in readiness for forcing, as directed last month, the fires by the first of this month may be begun to be regularly made, but so moderate that the temperature may not exceed 50° or 52° for the first week, and afterwards 55°, until every bud in the house has begun to swell. This is matter of vast importance in the forcing of all fruits, and particularly that of the vine; for if the temperature were begun and kept up to a high point, the consequence would be, that only a few of the leading and strongest buds would start; the greater part, particularly such as are situated next the bottom of the shoots, would not spring at all, and consequently the crop would be proportionably scanty. It is, therefore, a leading feature of good management, that every bud on the vines break; not that all will probably be ultimately allowed to remain, but it is much easier to take off a shoot, or a fruit, than put one on. From the time the house is first shut up, the syringe should be freely used upon the branches, for the same purpose as hinted at in the peach-house; namely, to soften the shoots and buds, and enable the latter to push more freely. The stems and larger branches, which were directed last month to be enveloped with moss or haybands, should be kept well and regularly moistened, by pouring water in a sufficient quantity upon them, for if they be kept continually moist, the rise of the sap will be facilitated, and the strength and breaking of the buds greatly promoted. After all the buds have evidently begun to push, or shown signs of vegetation, which will be observed by the loosening of that brownish cotton-like envelope, with which they have hitherto been protected, and the rudiments of the young shoot bursting through it, the temperature should be raised to 60°, 65°, and 70°. This rise of temperature must not, however, be sudden, or the same evils which have been hitherto guarded against would follow, that is, the shoots would push weakly, and many of them would not show fruit. If the rise of temperature be effected in the course of the month progressively, it will be good management. The borders within the house should be supplied with water, occasionally giving good water-

ings with liquid manure. The syringe must continue to be used mornings and evenings freely during the whole month, and the house regularly filled with steam every morning by eight o'clock, and in the evenings soon after the fires are lighted, and when the flues will be sufficiently warm. When the fires are made up for the night, a few pot-fuls of water may be sprinkled over the flues, this will keep up a moist steam during the night. There need be no fear of overdoing this operation, for vines are found to break or push their buds best and most regularly in a humid atmosphere: indeed, some good gardeners introduce a quantity of unfermented horse-dung, or leaves, into the vinery, which they build up in a ridge, and by continual turning, watering, and adding to it, keep up a steam in their houses. This steam is of the utmost importance where the vines are infected with insects, as the steam thus produced contains a large portion of ammoniacal gas, which is well known to be destructive to all insects, while it does not injure the vines, at least before their leaves expand. This practice is highly conducive to the health of the plants; but where neatness and order are a consideration, it may be objected to, as having no very agreeable appearance, and a much less pleasant smell; a substitute, however, has been pointed out by an eminent horticulturist and chemist, and may be with fewer objections applied. This substitute is formed by pouring a solution of *crude muriate* of *ammonia* upon quick lime, and the gas thus obtained may be applied with a pair of bellows to the plants. The great use of steam in forcing the vine seems to be, (no matter whether the steam be that of pure water, or of that combined with any of the other gases,) first to soften the wood and eyes, and enable them to break more freely; and secondly, the destruction or prevention of insects. These powerful and useful effects being produced by such simple means, are not to be neglected.

Air should be admitted freely, to strengthen the young buds as they are developed, and also to keep the temperature at an equal height. Changing the air thus daily is of the utmost use; the confined air, particularly when charged with the rank vapour from the dung, where it is used, or that of the confined air in the house where that is not even used, will soon stagnate

or get foul, and should be allowed to escape, and the house re-charged with fresh air.

It sometimes happens that vines, which have not been pruned until a short time before they are begun to be forced, as well as those, whose shoots may not have been fully ripened in autumn, will bleed after vegetation has begun, which, if not prevented, will materially weaken the vines, and injure the forthcoming crop. This bleeding is not easily prevented; but, as in all cases, a preventive is better than a cure, it will, if it once happen to a gardener to any serious extent, sufficiently remind him of the necessity of pruning his vines in autumn, soon after vegetation ceases, but not till the wood be ripe. Were this always attended to, this complaint would seldom require a cure.

Many remedies for bleeding have been used. Abercrombie recommends searing the place over, and covering it with melted wax; or with warm pitch spread upon a piece of bladder; or to peel off the outside bark to some distance from the place, and then press into the pores of the wood a composition of pounded chalk and tar, mixed to the consistency of putty.

Speechly recommends to peel off, or divest that part of the branch adjoining the wound of all the outside bark, then with a sponge to dry up the moisture, and immediately to wrap round the wounded part a piece of an ox's bladder, spread over with tar, or pitch made warm, in the manner of a plaster; then tie the whole securely with a strong thread, well rubbed with bees'-wax: these must remain on for three weeks or a month.

Nicol recommends searing the wound with a hot poker, or red-hot iron, in order to dry it, and then to apply hot wax.

Knight, in a communication to the Hort. Soc., recommends four parts of scraped cheese to be added to one part of calcined oyster-shells, or other pure calcareous earth, and this composition pressed strongly into the pores of the wood.

When the vine is in full leaf, it is not liable to bleed when cut, therefore the largest branches may be cut during the growing season with safety.

Vines are also cultivated in almost every pine-stove; however, the introduction of low pits for cultivating the latter, from the want of sufficient room, precludes the vines from

those structures; but where there are fruiting and succession-houses sufficiently capacious, we can see no objection to their being introduced, as by that means, ripe grapes can be had much earlier than is generally deemed necessary to have the principal crops in the vineries. Vines intended to be grown in the pine-stove should always be planted outside the house, and their stem introduced into the pine-house, when required to be put into a state of vegetation. They are often, however, left in the house, and never taken out during the period that they are not in a vegetating state. We would advise, consistently with our own practice for many years, the taking of them out when the fruit is cut, and of course the wood ripened, and to train them along the front of the house to temporary stakes driven into the border to support them, or to fix them to the front of the house in such a way as not to create a shade, nor to be in the way of the front sashes or ventilators.

They may be taken into the house any time from November till January, and trained *only* up the rafters, so as not to shade the pines during winter. Their shade during summer, if not allowed to ramble too much, will rather be an advantage to the pines than otherwise; and we would plant vines where metallic houses are used, purposely to give a partial shade, with their leaves, to the pines. The general management as to pruning, thinning, and training, will be nearly similar to that to be described in the regular vinery, so that any separate directions on that head may be deemed unnecessary.

M'Phail, and many gardeners since his time, contend that they should remain always in the pine-stove, without being removed while they are not in a state of vegetation, and he gives the following directions for their management: "In the month of November or December, cut down all the old wood to about the height of the pit, leaving only two young shoots, the strongest that can be got; the strongest one to shoot from the buds and to bear the fruit, the other to be cut down short, and to grow long shoots to bear fruit the succeeding year. This is to be done successively, year after year, leaving the old stem of the vine to grow, as the older the plant is the better, at least the fruit will be higher flavored."

After the vines are pruned, tie them nearly up to the glass with matting, to iron rods or laths fixed to the rafters on purpose. As soon as they begin to swell in their buds, and show themselves ready to break, let them down about a foot from the glass, so that they may receive the benefit of the warm air round about them, and not be liable to be injured by frosts. If the buds burst strong and bushy, it is a good sign that they will show fruit; but if weak, the contrary will be the effect; and if they miss showing fruit on the fourth or fifth joint, they will show none at all, and in that case, the young shoot that does not show fruit should be broken off, as it would only take the nourishment from the others, which have shown fruit. Do not let more than one or two bunches grow on one bud, for if too many be left on the plant they will not swell well. If the vines be planted inside of the house, care must be taken to keep them sufficiently watered; and in dry weather, in the spring and summer, the border on the outside of the house, in which the roots of the vines run, should be plentifully supplied with water.

The forcing of vines by dung-heat has been often tried, and has, in many cases, succeeded to the utmost expectation. In *Holland* they are very generally forced by that means in pits constructed for the purpose, and one spirited horticulturist has adopted the practice, under the direction of a Dutch gardener in this country. In Denmark, wooden houses are so constructed, that by means of linings of hot dung applied to them, grapes are brought to tolerable perfection.

In the years 1825 and 1826 we practised a somewhat similar plan, and perfectly succeeded. Having a few vines of the Royal Muscadine, which annually bore immense crops of fine grapes upon a wall, but which seldom or ever ripened, the situation being adverse; we erected a temporary house the length of the wall, and at four feet distant from the wall put in a row of oaken posts, which were charred as far as they were covered with the mould. These posts stood two feet above the ground-level, and were braced together at top with a piece of plank two inches thick, and four broad, upon which the bottom of the sashes rested, as well as the rafters, which latter were four inches by two, and rested in the usual way

upon the above wall-plate, and top of the wall, to both of which they were fixed by a bolt, which was so constructed that they could be removed at pleasure. The upright row of posts, above noticed, was nine feet apart, and the space between the ground and the top of them was left open. In front of this house we sunk a pit, for the linings of hot dung or leaves (the latter generally used), four feet deep and two in width; this cavity was supported on one side by a nine-inch brick-wall, and covered with wooden shutters to keep in the heat, and so to force both heat and steam through the spaces between the posts which supported the roof. When the dung was past its first strong heat, we drew part of it into the inside, and formed a ridge sufficient to keep up the desired temperature, and by adding fresh leaves or dung could keep up a heat sufficient to ripen grapes by the month of July. The internal space to be heated was so small, that we found it no difficult matter to keep up a higher temperature than was even required. The back wall of the house, if it may be so called, (but which really was one of the garden-walls, against which the house was erected,) was only nine feet high, which only afforded sufficient head-room to get in to dress the vines, which were planted, as already observed, upon the back wall, and as the heated dung forming the ridge occupied a considerable proportion of the lower angle of the house, a small space consequently was left to be heated. By these means we enjoyed all the benefits of a humid mild heat, so favorable to the vine, as well as producing those gases which are disengaged from the dung while undergoing fermentation, and which, though destructive to animal life, are more than probable not uncongenial to that of vegetables. In principle, this differs very little from the Dutch and Danish practice, but in the convenience and arrangement we consider it superior, as the dung or leaves are brought into this house, without opening any part of the structure, which, particularly in winter, is attended with inconvenience and loss of heat, and there is no waste of the materials used in producing the required heat, by their being exposed to the changes of the atmosphere. The sashes were all movéable, so that whatever portion of air was required could be admitted, either from the outside or from

the inside. The whole of the structure, excepting the wall of bricks and the row of posts, was moveable, so that when not required for one piece of wall, it could be carried to another. In this house, during the winter months, we constantly grew small salads, mustard, cress, &c., in shallow boxes and flat pans placed upon the ridge of dung. It also served for a hospital for sickly and diseased exotics, which, when placed upon the dung or plunged into it, soon recovered, if their diseases did not proceed from causes, to which this mode of treatment was not congenial. The roof was regularly matted up at nights, when the weather was so severe as to require it.

In a communication to the London Hort. Soc. by Mr. Anderson, a method of forcing vines upon a large scale is recorded, as practised by J. French, Esq., at Hornden, Essex, for nearly the last twenty years.

"About the beginning of March, Mr. French commences his forcing by introducing a quantity of new long dung, taken from under the cow-cribs in his straw-yard, being principally, if not entirely, cow-dung, which is laid upon the floor of his house, extending nearly from end to end, and in width about six or seven feet, leaving only a pathway between it and the back walls of the house. The dung being all new at the beginning, a profuse steam rises from the first heat, which, in this stage of the process, is found to be beneficial in destroying the ova of insects, as well as transfusing a wholesome moisture over the yet leafless branches, but which might prove injurious, if permitted to rise in so great a quantity, when the leaves are pushed forth. In a few days, the violence of the steam abates as the buds open, and in the course of a fortnight the heat begins to diminish; it then becomes necessary to carry in a small addition of fresh dung, laying it in the bottom, and covering it over with the old dung freshly worked up; by which a renovated heat and a moderate exhalation of moist vapour are produced. In this manner the heat is kept up throughout the season; the fresh supplies of dung being always laid at the bottom, in order to smother the steam, or rather to moderate the quantity of exhalation; for it must always be remembered, that Mr. French attaches great virtue to the supply of a reasonable portion of the vapour. The

quantity of fresh dung to be introduced at each turning, must be regulated by the greater or smaller degree of heat that is found in the house, as the season and other circumstances appear to require it. The temperature kept up is pretty regular, being from 65° to 70°. Mr. French contends, that the moist vapour transfused through the house is essentially beneficial, not only because it discourages the existence of insects, and destroys their ova, but it likewise facilitates the setting and swelling of the fruit."

Forcing vines by means of dung-heat, has been occasionally practised since the days of Justice, in Scotland, and Lawrence and Switzer, in England, but not much attended to till of late years. That it is practicable, is placed beyond all doubt; but the question is, whether it be more economical than the more usual mode of applying fire-heat. Mr. Knight gives the following directions for ripening grapes in an inclined melon or cucumber frame, either with dung-heat or without:—After "placing the bed at three feet distance from the wall to which the vines were trained, and introducing their branches into the frame, through holes made at the north end of it (the vines having been trained to a southern wall), as soon as the first violent heat of the bed has subsided. The White Chasselas grape thus treated, ripens in July, if the branches of the vine be introduced in the end of April, and a most abundant crop be thus obtained; but the necessity of pruning very closely, renders the branches, which have been forced, unproductive the succeeding season, and others from the walls must be consequently substituted. I have," he says, "always put a small quantity of mould in the bed, and covered it with tiles. If an inclined plane of earth be substituted for the hot-bed, and vines be trained in a frame adapted to it, the grapes ripen perfectly in August; and if small holes be made through the sides of the frame, through which the young shoots of the vine can extend themselves in the open air, a single plant, and a frame of moderate size, will be found annually to produce a considerable weight of grapes. For this purpose, the frames should not be more than eight or ten feet long, nor more than five or six in breadth, or the young shoots will not be so advantageously conducted out of them into the open air; and

the depth of the frame, either for the hot-bed or for the inclined plane of earth, should not be less than eighteen inches. The holes in the sides of the frame, through which the young shoots are to pass, should of course be closed during the spring, and till wanted; and if the weather be cold, it will be necessary to cover the frames during night. When the grapes are nearly full grown, and begin to ripen, it will also be highly advantageous to draw off the glasses during the day in fine weather, by which means the fruit will be exposed to the full influence of the sun without the intervention of the glass, and will attain a degree of perfection, that it rarely acquires in the vinery or hot-house."

Grapes are obtained in bad seasons by covering the established plants upon the wall with a temporary frame of rafters, upon which are placed any spare lights, that by that time may have been removed from the early peach-houses, or other houses where the crops may have been gathered; sometimes a temporary flue is built, to give an additional warmth, and to counteract the effects of damp, as well as to ensure the ripening of the fruit, and their preservation afterwards for almost any length of time. In other cases, the glasses alone are found sufficient for the purpose of ripening the crop.

A market-gardener near Bath, some years ago ripened grapes under hand-lights. In this case, the fruit remained within the glasses, and enjoyed the protection of the glass, while the shoots were allowed to extend themselves in the open air, by being let out of the glass on removing one of the panes near its top.

A succession of ripe grapes (as described by several writers in the Hort. Trans.) is to be obtained by growing the plants in pots, in very rich mould, and watered with liquid manure. The plants to be placed in any of the forcing-houses of suitable temperature, and when ripe, removing the fruit upon the plants into a dry airy apartment, of a regular temperature. They are said to keep in this way longer in a perfect state than any other. Vines grown in pots have a curious appearance when loaded with fruit, and are not only useful for prolonging the season of this excellent fruit, but are highly

ornamental, either in the houses where they are grown, or introduced among exotic plants in the green-house or conservatory. Although the vine in general is allowed a greater latitude for its roots to run into than any other of our cultivated fruits, it is nevertheless found to produce tolerable bunches in pots, containing not more than two cubic feet of mould. Pots of that size, filled with rich mould, are asserted by Knight to be capable of nourishing a vine, which, after being pruned, covers twenty square feet of surface, if they be liberally supplied with liquid manure.

The retarding the maturation of grapes till a late season is as important an object to the gardener as to facilitate their ripening early in spring, and appears to be less understood; for where there is extent sufficient for the adoption of both plans, grapes may be had fit for the table every day in the year. The sorts of vines most fit for a late crop, are not, as is generally the case in the culinary garden productions, fit also for the earliest: the case is otherwise. The Sweet-waters and Muscadines, and some others, are fittest for early crops, requiring much less time to bring them to perfection; whereas, the Muscats, Syrian, White Nice, Black Damascus, St. Peter's, and some others, are the fittest for late crops, requiring much longer time in coming to their full size, and also a considerable time after attaining that size, before they ripen, and more particularly their properties of remaining a long time upon the vines after they are ripe before they show symptoms of decay; and, last of all, their retaining a saccharine sweetness after they are considerably shrivelled up. These, therefore, should be made choice of for the latest crops; and if retarded, by removing the lights entirely off the house, so as to keep back the swelling of the buds till as late a season as possible; and after it is no longer safe to trust the advancing buds to the weather, to put on the lights all night, taking them down during the day, so as to keep them as much exposed to the air as possible, and using only a little fire. While the vines are in bloom in autumn, when the fruit is approaching to its full size, give a little fire, to prevent any check to their swelling off, when the nights begin to get cold, during the rest of

autumn; and as long as the fruit remains upon the vines, give only such fire-heat as will prevent the effects of damp from destroying the fruit.

The latter sorts of grapes are thus preserved till long after Christmas. Arkwright, a writer in the Hort. Trans., has treated this subject more systematically, by gradually habituating his vines into a state of late bearing. He chooses for that purpose the later kinds of vines, and grows them in houses used alternately for pines and vines. About the middle of February, he removes his pine-plants into another house, and the preceding year's crop of grapes being gathered, he takes down the glasses so as to admit the free access of air at all times till the end of April, when the buds of the vines begin to swell. At this time, he applies a little fire-heat during the night in cold or cloudy weather, and air is freely admitted. At this time, he again brings in his pine-plants, where they remain till the following February. By this late and slow process, the grapes do not begin to ripen till towards the end of October; and some of the very late kinds not till Christmas. When he has occasion to introduce a young vine into the houses where his late grapes are grown, it is found, by the second or third year, to have lost its disposition to break into leaf at the accustomed season, although treated exactly like the other plants in the house. So powerful are the effects of habit. His general treatment of the vines, in regard to pruning and training, does not differ from the common practice.

FORCING CHERRIES.

The temperature in this compartment should be regularly attended to, and not allowed to exceed 50° by fire-heat during the day; after the admission of plenty of air, it may be allowed, during the day, to reach 60°, but not higher. Air should be admitted regularly every day; and when the weather is unfavourable for its free admission for more than one or two days together, let the fires be kept slightly up, to allow the sashes either being opened, or the ventilators, if the house be aired by those means; for nothing is so injurious to cherries,

plums, and apricots, than being long kept in a close atmosphere. Water should also be regularly and moderately given them, but not in too large a quantity, as until the fruit be fully set, they should be cautiously supplied with that element. After that time, they will require it in a more liberal quantity. The house should be regularly steamed, mornings and evenings, by sprinkling water upon the flues, which will, in a great measure, serve for watering at the roots; while the buds are swelling, and until the blossom be nearly expanded, the syringe should be used once a day, both for the softening of the buds and the suppression of insects.

Cherries are subject to insects both in the forcing-houses and on the open walls; care, therefore, must be taken that they do not get a-head at this time; for if they do, the injury will be considerable. The green fly will be apt to visit them as soon as the young shoots and leaves come out, and recourse must be had to fumigations with tobacco for its destruction, as well as the syringe, applied with all its force upon them, at such times as the blossom is not endangered by it. There is a small caterpillar, which is often very annoying in the cherry-house, and this must be looked for carefully; wherever any of the leaves appear curled up, it is almost sure to be found within them; these, for the greater security, should be picked off, and carried out of the house.

Such cherries as are intended to be accelerated upon the open walls, under the glass-case recommended last month, should, towards the end of this month, be covered up and regularly attended to, in respect to air, water, &c., in the same manner as already directed.

FORCING FIGS.

The preceding directions for cherries are also applicable to figs. The temperature should be steadily kept, during the first fortnight of the month, at or nearly 50°, and gradually, towards the end of the month, raised to 58° by fire-heat, allowing five or seven degrees of rise by sun-heat.

Water must be regularly supplied as the state of the plants may require, and air be freely admitted daily. A watchful eye

should be kept for the appearance of the red spider upon the leaves, which should be expelled by force of the syringe, or else by sprinkling sulphur mixed with water upon the flues, when pretty warm, as directed last month; however, if the plants be kept regularly watered, and the house ventilated, this enemy will not be seen; a too dry and very high temperature is the agent that brings it into life, and water applied with considerable force from the syringe, or the application of sulphur, as above described, are probably the only means of getting rid of it.

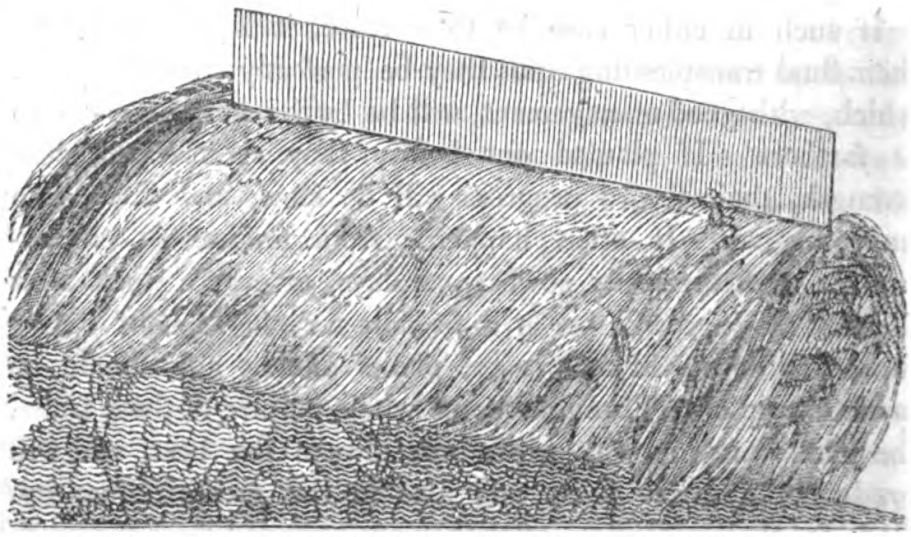
FORCING CUCUMBERS AND MELONS.

If the instructions given last month under this head have been acted upon, and no accident has occurred to the plants, they will, by the end of the first week or beginning of the second, be fit, most probably, for planting out into the beds, in which they are to perfect their fruit; however, if the plants be weak, which will chiefly be owing to either too little heat, or drawn up slender and long-stemmed, owing to an excess of heat and insufficiency of air, in either case they should not be finally transplanted out until they be quite strong and stocky.

If such in either case be their state, it is better to defer their final transplanting until they be perfectly strong enough, which, with good management, will be by the end of the month at farthest. If planted out before they acquire sufficient strength, their future progress will be slow, and their crop unproductive. It often happens, from unforeseen circumstances, that the seeds sown some days, or even a week after the first sowing, will be in a fit state for *ridging* out before those first sown; in such cases, plants of that age should be made choice of. Throughout the whole culture of these fruits, the plants most rapidly grown are always the best, and will produce the finest fruit, and also in the greatest quantity. Beds for their reception, after they are removed from the seed-bed, should be preparing for them without delay. By the beginning of the month, the dung of which they are formed should be got in readiness; that is, it should be duly pre-

pared, by repeated turning and fermenting, giving plenty of water, should it be dry in the first instance, or heat-dry in the process. The materials of which such beds should be built, ought to be of the very best quality, and if leaves are to be had, one-third or even one-half of them should be added. They most generally give out a more lasting and more regular heat than beds built of dung alone. If either material be scarce, a bed of the same dimensions may be built of fagots, heath, or any useless spray, which, being heated by means of linings of hot dung, or dung and leaves, will be found to answer the purpose very completely. Beds of this kind we have already recommended, and for many purposes they are better than beds built entirely of dung; in such beds there is little chance of the roots of the plants sustaining injury by burning or over-heat.

In either case, as the plants appear strong enough for *ridging* out, let the beds be prepared for them, of the following dimensions. For cucumbers, their height at the back should not be less at this season than four and a half feet, and three and a half in front, that is, if they be built upon ground nearly level. The following reasonable method has been recommended by Knight, and is now very generally adopted. Instead of building the beds upon a level piece of



ground, he places them upon an inclined plane of earth, elevated about 15°, making the bed afterwards of an equal height, both at the back and front, as in the annexed figure.

The merits of this improvement are obvious: the bed of fermenting matter is all of an equal thickness, and consequently will be more equally heated; the mould in which the plants are planted are also of an equal thickness, a matter of much importance to the plants; the angle of elevation given, the plane upon which the whole is built, is sufficient to present the glass at a proper angle to the horizon, so as to enjoy the greatest portion of the sun's rays at this season, when it is low in the horizon, which is a matter of much importance to the welfare of the plants; this angle may be more or less, according to the season of beginning the forcing. The frames which he purposes for such beds are also like the dung-bed, of the same depth both at back and front. Thus the plants are placed at an equal distance from the glass, which is not the case with plants in frames of the usual construction.

According to the instructions already given for building the seed or nursing-bed, this should also be placed upon a dry, and if possible, a sheltered spot, fully exposed to the morning sun, but sufficiently sheltered from the north, east, and west, and the ground should be rather elevated just the size of the intended bed, to afford greater means of applying linings, as well as to keep their bottoms free from water or damp. On no account should the beds be sunk under the surface at this season. According to the dimensions of the frame or frames, mark out the size of the bed, by driving in four stout stakes, one at each corner of the intended bed, and as nearly perpendicular as possible, which will be a guide in building the bed. In marking out the size of the bed, let it be a foot at least larger on each side than the size of the frame. The whole being marked out, proceed to make the bed, by shaking and mixing the dung, or dung and leaves well together, as it is laid on, and beat it well down with the back of the fork as the process goes on; avoid treading it, as beds too much trodden seldom work so pleasantly, and are more liable to burn than such as are suffered to settle gradually of themselves. In this manner proceed, until the bed has arrived at nearly the desired height, taking care to build the sides and ends as nearly perpendicular as possible. When within six inches of the desired height, level the whole surface, and

upon it place six or eight inches of short dung, such as has fallen upon the ground round the bed in the process of making it; level the whole, and, as soon as finished, place the frames and lights upon it, which should be kept closely shut down until the heat rise briskly. If it be slow in rising, cover the lights with mats for a day or two. As soon as the heat rises, open the sashes a little, to let the rank steam pass freely off.

The beds being thus finished, and the heat sufficiently up, it is then in a fit state for earthing over, forming the hills for the reception of the plants, &c. Before laying on the mould, take off the frame and lights, and level the surface equally over, if much sunk into irregularities in the process of heating. The whole being regulated, and the frame and lights being replaced, proceed to cover the whole surface of the bed with rich dry light mould, which, for this purpose it is presumed, has been prepared during the summer, and a portion of it placed under cover, so as to be dry and ready for use when wanted. The thickness that this mould should be put on, need not be more than two or three inches, just merely sufficient to prevent too much rank steam at any time filling the frame. Under the centre of each light, place on a little hill about one bushel of the same mould, upon which the plants are to be planted as soon as the heat is sufficiently up, so as to warm the mould in the hills to a sufficient temperature. The higher these hills are kept the better, so as to admit of sufficient space for the plants, in order that they may not touch the glass.

The reason for planting the plants upon these hills, instead of not earthing the bed all over at once, is merely by way of precaution in case of violent after-heats; in which case, it will more readily pass off in steam between the hills, as well as offering the advantage of using the beds a few days sooner than if it were all earthed over at once to its full depth. If the beds should heat too violently after the plants are in, the roots of them can be more readily prevented from sustaining injury, by drawing the mould away from round the sides and from under the bottoms of the hills, and supplying the place with fresh mould.

The beds being thus finished, in two or three days they will

be, in ordinary cases, fit for the reception of the plants. The plants, as directed in January, being planted into pots, three plants in each, the strongest and most stocky should now be chosen, and removed carefully from the seed or nursing-frame in a box or basket, covered over so as to prevent any accident in their removal from one frame to the other. The day previously to this final planting out, the plants in pots should have been gently watered, which will render the balls of mould round their roots less liable to fall in pieces when turned out of them.

They should now be carefully turned out of the pots and planted in the hills, one pot of plants, that is, three plants into each hill; draw the mould gently round their stems, and let them be planted rather deep than otherwise. The plants being thus planted, give the hills a gentle watering with a fine-rose watering-pot, sufficiently to settle the mould round their roots. This water, as should all such that is used for watering either cucumber or melon-plants at this early season, should be warmed, either by being placed in the frame the day preceding that on which it is used, or it may be rendered sufficiently warm by the addition of water warmed for the purpose, and brought as near to the temperature of the bed as possible. The process of planting or *ridging* out being thus finished, shut up the lights, till the steam rises again strong enough to require to be let out by degrees.

Whether cucumbers or melons be cultivated in common dung-bed frames, or in pits of whatever construction, the principle of temperature, planting out, &c., are the same, with this difference only, that some pits are so constructed that only a small portion of steam from the fermenting matter, either under them or from the linings by which they are heated, can enter into the bed. This deficiency of steam must be supplied by sprinkling water on the flues when they are sufficiently heated. Both cucumber and melon-plants thrive much better in a humid high temperature than in one that is dry, however warm it may be; therefore the more they can be supplied with that heat and humidity, the more likely are we to be successful in their production.

The plants being ridged out, care must be taken to supply them with air every day, in a greater or less quantity, as the weather and state of the beds may determine. In giving air at this season, great caution is required, so that too much is not given at once, as to chill the frame, and that it be prevented from blowing in too great a quantity at once, particularly when it is frosty or cold, and coming into immediate contact with the plants; to prevent this evil, it is well to hang pieces of old thin mats over the openings, so that the current of air blowing through the mats may be broken before it reach the plants. Steam will now abound, particularly during night, if the beds be of sufficient warmth; this, although highly necessary for the welfare of the plants, must not be suffered to abound too much so as to injure them, it will therefore be often necessary to leave open a small portion for the admission of air during the night, for the more ready escape of the steam; however, it will always be necessary to let the ends of the mats with which they are covered hang over such openings, to prevent the entrance of cold or frosty air into the beds. These mats must, however, be so placed, as to be quite clear of the linings; for if they be let too low down, they will conduct the noxious rank steam from them into the beds, and will, if such be permitted to any extent, destroy the plants.

The principal object now to be attended to, is to support a constant steady growing heat in the bed, so as to keep the plants from sustaining any check in their growth. To attain a sufficiency of heat, it is necessary to attend to the heat of the bed; and when the first symptom of its declining appears, let linings of prepared hot dung be applied, sufficiently strong to re-invigorate the declining heat of the bed. If the weather be moderately mild, and the materials of which the beds are formed be good, a little protection laid round the sides of the bed, of dry straw, bean-haulm, fern-fronds, or the like, not of themselves to throw any heat into the bed, but to protect it from the external cold air or cutting winds, may yet be sufficient. This precaution being applied in proper time, the heat may be sufficiently retained in the beds for some days longer, and the necessity of applying the linings of hot dung

may therefore be postponed a little longer; but too much dependence should not be placed upon this covering; for if the bed once becomes cold, the plants will sustain a very serious injury before it is possible to get up the temperature again sufficiently strong. Should the linings, when applied, at any time raise too much heat into the bed, they can be drawn a little back all round the frame, so as to allow the escape of their heat, and be again placed close when it is necessary to admit greater heat.

A bed properly put up, if of good materials, should last, with a little protection, as hinted at above, for three weeks, but seldom longer at this season. Without the aid of linings, it will often happen, however, that beds of excellent materials will not retain a sufficient heat so long. At all times, and under all circumstances, this is only to be ascertained by a daily examination of the beds.

For the first three or four weeks after planting out, great attention should be paid that the roots of the plants sustain no injury from over-heats; for it not unfrequently happens, that beds put up for some time, and when even earthed all over to their full depth, will heat a second time so violently, as to render the plants, when even well established, in great danger of being burnt at their roots. To guard more effectually against such accidents, many persons place a piece of turf under the hills before they are formed, and this precaution may be attended to as the trouble is not great; but the most effectual means of preventing burning at the roots, is by a daily examination of the mould at their roots: when that appears dried up, or has too much heat in it, which can be always readily ascertained by thrusting in the hand, the mould so dried, or over-heated, should be gently removed, and replaced with fresh, as already observed. The hills may also be reduced as much as possible, leaving them just sufficient basis to stand upon, without danger of falling; in this state they may remain till all danger of burning be over, when the mould may be again replaced to their original size.

If every thing has succeeded, in the course of eight or ten days the young roots will be beginning to show themselves all round the hills: this is looked upon as the first symptom of

the plants being in a state of progressive welfare. When such roots appear, let a little mould be laid over them, to the thickness of three-quarters of an inch, or an inch and a half at most. Such mould should be of the same quality as that of which the hills are formed, and for this purpose should have been in the bed for a day or two, so as to have attained a temperature equal to that of the rest of the mould in the frame. It is well not to put too much of this mould round the roots at once; a little should only be put at a time, and that often repeated, and upon the appearance of the roots this should not be neglected. Towards the end of the month, if the plants were planted out towards the beginning, the shoots will be making fast progress; and if the first bud, while yet in its embryo state, was picked out at the time of potting-off, or, if not then done, when they were ridged out, one, two, or probably three shoots will now be formed, which, as they advance, should be stopped; that is, by pinching off the point of each shoot a little above the first or second eye or bud: this will cause them to throw out lateral shoots, and from the first or second joints of such lateral shoots, fruit will most probably show. If such should not, however, be the case, these shoots, in their turn, should be topped or shortened in like manner, and so on until fruit or female flowers appear. This will not only throw the plants into a state of greater fruitfulness, but will also render the plants more strong and stocky. Such runners now formed by this first pruning, will most probably show fruit at their first, second, and third joints. In many cases, where the principal shoot or runner is not thus stopped, it will probably run three, four, or six feet, without showing fruit, or without throwing out side or lateral shoots to fill the bed with vines. As the vines (as they are technically termed) or runners proceed in their growth, let them be stopped when running too far without showing fruit; and as they advance, be neatly and regularly trained down to the surface of the mould by small hooked pegs, to keep them in their respective places, and keep them close to the mould, so that, as they advance, they may emit roots to strengthen themselves and afford nourishment to the fruit.

No further pruning will be necessary for them until they are

in a bearing state, except any vines, which appear weak or ill-placed, or where they may be too much crowded, such only should be entirely displaced. When it becomes necessary to remove any such shoots, pinch them neatly off with the finger and thumb, in preference to using the knife; but if the knife should be used, let the shoot so amputated be bruised between the finger and thumb, so as to stop or prevent too great a share of sap, or in other words, the blood of the plants, from escaping.

If the plants have been well managed, and no accident has taken place, fruit will be showing in abundance upon the cucumber plants. The melons, from their nature, will not show for some time yet, most generally some weeks afterwards. When the female flowers appear, which will be readily distinguished from the male flower, the former always having at their base the rudiments of the future fruit, the latter having no such appendage, but merely a simple flower containing the stamina, with the fertilizing dust, pollen, or farina, covering the tips of the stamina or male parts of fructification. When such flowers appear, the important office of assisting impregnation falls to the care of the cultivator, and should not be neglected.

The work of impregnation, or *setting* the fruit, as it is technically called, is, as Abercromby very justly observes, a most important operation of art incumbent on the gardener, particularly in the early cultivation of these plants, while wholly confined in frames, as at this time the operations of nature are almost excluded. This should be done accordingly as the flowers, both male and female, come into full bloom; and it is performed by injecting the farina or male dust into the stigma or female part of the fructification. Plants, which contain the male and female parts of fructification within the same flower, and are hence called *hermaphrodites*, do not require in most cases this care; but such as have these organs placed in different flowers, are therefore less likely to be fecundated without artificial means, particularly when confined in the close atmosphere of a common hot-bed, and at so early a period of the year when few or no insects are in existence to carry the impregnating matter from one flower to another. Such plants

are called *monœcious* plants, from the circumstance of their respective organs being placed each in one distinct flower. Unless the female flower, which generally carries at its base the rudiments of the young fruit, be impregnated with the pollen or farina of the male, the young fruit will constantly turn yellow, and drop soon after they have flowered.

In summer, when the plants are fully exposed, the gentle breezes of wind, and the different winged insects roaming from flower to flower, carrying upon their wings the fertilizing dust from one flower to another, will, for the most part, perform this office without the care of the cultivator. But in spring, and during the winter months in particular, when small portions of air can only be admitted, and when no bees or other flying insects inhabit the frames, the necessity of artificial impregnation becomes absolutely necessary, by carrying the male to the female blossoms in the following manner:—

At the time when the flowers of both sexes are fully expanded, or the day after at farthest, the male blossoms, which are easily distinguished from the female, as noticed above, (no appearance whatever being shown of their having the rudiments of fruit attached to their base,) gather such of the best male blossoms as appear strong, and with them a portion of the peduncle or flower-stalk, about an inch in length, by which to hold the flower in one hand, while with the other pull off the petals or corolla (*the colored leaves of the flower*) carefully from about the stamina and antheræ; then, still holding the flower by the peduncle between the finger and thumb, apply the antheræ, or top of the stamina, to the centre of the three stigmats of the female flower, and turn it about two or three times, that it may discharge or inject a sufficient portion of the pollen or farina into the said stigmats or female organs, and then throw it away, using a fresh male flower for every female one operated upon, unless the male blossoms be scarce, (but this is seldom the case,) when one male flower may be sufficient for several females.

It may sometimes occur early in the season, that female flowers may appear when there are no male ones wherewith to impregnate them; this would be a mortifying circumstance indeed, and recourse must then be had to other plants in the

same gardens; but if it should so happen that there are none, in this case male flowers may be brought from a distance, carefully packed up in paper, and kept quite dry; and with them, the important office may be performed. Some gardeners leave the male flowers attached to the female until they drop out of their own accord; but this is unnecessary, for if both blossoms be fully formed, the office of impregnation will be completely performed in a few seconds. The middle of the day should always be preferred for this purpose. If there be a brisk growing heat in the beds, the fruit will, in a few days after impregnation, show evident signs of the approaching maturity. If the beds be in good management, and the fruit of a good kind, the blossom will continue attached to the fruit, often till it be fit for use, which is, when they are from five to six inches long. Some kinds will grow so rapidly, under excellent management, as to attain the length of twelve or fifteen inches with it still attached to them. Early in the season, it should be an established rule to set every promising flower as it comes into full bloom; and the critical moment seems to be the early part of the first day on which the blossom opens. Water should not be given them immediately after the setting of the blossom. The male blossoms often grow in large clusters upon the vines, and these should be thinned out, leaving a sufficient number only to ensure the setting of the crop. These should not, however, be entirely removed, as without them there would be no fruit. As the blossom fades, it should be picked up and thrown out of the beds, as being apt to damp and injure the vines.

It will be necessary for successional crops of melons and cucumbers, as well as to guard against accidents which may attend the young plants now in seed-pans or potted-off, that a few seeds be occasionally sown in the frames or pits now at work. Such as were sown at the beginning of this month, will, under good management, be in fruit by the end of March or the beginning of April; and those sown about the middle or end of this month, will also be in fruit by the end of April, and will be in full bearing during May and June. Few cultivators sow melons for general crops before the beginning or middle of this month; as those sown sooner, if they withstand

the inclemency of the weather, will come into fruit before there be sufficient sun to give them a proper flavor. No fruit that we cultivate requires more of the influence of that soul of vegetable life than the melon. A bed or two, however, in large families, may be brought in sooner, but their flavor will not be so fine as those which are ripened during July and August. Such sorts only should be sown for the earliest crops as will require less time to come to perfection; and of these, the early Canteloupes are to be preferred. The directions hitherto given, as regard the sowing, potting-off, and ridging out of cucumbers, are also applicable to melons; with this difference only, that beds for the latter fruits should be built a foot at least higher, and a brisker heat kept up to them during their whole culture, and the mould in which they are grown should be much stronger than for cucumbers, and as it is added to their roots, it should be firmly trodden, so as to be as solid as possible; but care must be taken in doing this, that their roots be neither bruised nor broken in the process. When melons begin to show fruit, great attention should be paid to them, that the office of impregnation be not neglected; for although cucumbers will sometimes, even at this early period of the season, come to tolerable perfection without this assistance, and often afterwards, melons will not set freely at any period without it; and should they occasionally set and swell to an ordinary size, they never will acquire that beauty nor flavor which they would if impregnated; they will also often go off when half grown, and will always be deformed and without flavor.

FORCING STRAWBERRIES.

Successional crops of strawberries should be brought into the forcing department, both at the beginning and also at the end of the month. Where many pots are to be forced, and where a constant supply is wanted, attention should be paid to such as were taken in last month, and as they advance, let them be abundantly supplied with air and water; both of which are essentially necessary to them in every stage of their growth.

FORCING ASPARAGUS.

Successional beds should be prepared for asparagus, both at the beginning and also at the end of the month. (For directions see *last month.*)

FORCING FRENCH OR KIDNEY-BEANS.

Kidney-beans succeed well, if planted in large pots, and placed in any of the forcing-houses, where a sufficient temperature is kept up; that of the pine-stove is the best suited for their production. They should be sown in shallow pans or boxes, and when two or three inches high, transplanted into pots of one foot diameter at their top, three or four plants in each pot, and placed upon shelves as near the glass as possible, so that they may enjoy a sufficient share of light. In all situations, French-beans require a rich soil; for this purpose, the pots should be half filled with good rotten dung, and upon this the young plants should be placed, covering their roots an inch or two with rich light mould; and as they advance in growth, let fresh mould be added to their stems, *until* the pots be filled to the top. They should be liberally supplied with water at their roots, and often sprinkled over the top, as they are extremely liable to be infested with the red spider. As they advance in growth, they should be supported with small branches stuck round them, to prevent their being broken. In such situations, under ordinary good management, plentiful crops of this esteemed vegetable may be obtained during the greater part of the winter, and all the spring months, until they can be procured in the open borders. Sometimes pits and frames are used to produce this crop; but where there is the advantage of a pine-stove, they can be more conveniently procured.

MARCH.

NURSING PINE-PLANTS.

In the course of this month, when the weather is fine, this department of the pinery will require to be examined, as was done to the fruiting-plants last month. The heat may now be on the decline, and require to be renewed, by trenching the whole bed over, and taking out such as may be much exhausted of the tan or leaves, and replacing it with fresh. The directions given for the fruiting-plants, as far as regards shifting the tan or leaves and replacing the plants, are applicable to the young pine-plants at this time. As the plants are taken out of the bed in which they are plunged, each should be neatly tied up with a piece of fresh matting, to prevent the leaves from being broken or injured, as well as for the greater convenience of handling them. In performing this operation, one person should gather up the leaves between his hands gently, so as not to pull the plants out of the pots, and hold them moderately tight, while another binds them up with fresh strings of matting; sometimes it is necessary to put two or even three several strings of matting round them, to keep up all their leaves. This should be particularly attended to at all times that the plants are removed; for, without this precaution, the leaves would be unavoidably broken, bruised, or otherwise injured, and the operators would not be able to perform the potting, &c., with so much expedition if they were left untied. When it occurs that a plant stands loose in the pot, it then should be supported by a neat stick, which will prevent it from being farther loosened, and will be a certain sign of its requiring to be re-potted.

As a great many will require to be now shifted, it will be necessary to have in readiness a sufficient quantity of proper mould, prepared previously, and kept dry in a shade for this purpose, as well as a sufficient number of pots, of the different sizes likely to be required, to suit the size and circumstances of the plants. All things being in readiness, the plants should

be examined, and all that require shifting should be selected and turned out of the pots, carefully placing one hand level with the surface of the mould in the pots, with the stem of the plant between the fingers, while with the other hand take the pot by the bottom, and invert it, striking the margin of the pot upon the edge of the potting-bench, so as to shake out the ball entire. The balls that are much exhausted at this time, should be carefully broken, and the roots singled out, and such as are decayed cut off, as well as some of the less strong and unhealthy roots; the decayed leaves round the stem should also be displaced, which will encourage the plants to push out fresh roots near the surface of the pot. The sizes of the pots used must be entirely regulated by the size and strength of the plants; for it is an erroneous notion that they should be shifted into pots bearing any proportion to those out of which they were taken. All strong growing healthy plants should be placed in pots of larger size, and such as are weak, ill-rooted, or sickly, should be put into pots of the same size as those from which they were taken, and, in some cases, in pots much less. The smaller the pots into which weak plants are put, the more likely are they to become strong. Fresh pots should be used for the plants which are shifted; and by no means use such as have been recently emptied, until they have lain for some time to sweeten. The pots should also be dry, and have (if not new) been previously cleaned. In potting plants of any kind, avoid using pots too large, for it is much better to shift the plants again in a month or six weeks, than to over-pot them at once. In draining the pots, use oyster-shells, if they can be conveniently procured: place one of them on the bottom of each pot, over the hole, with the concave side uppermost; they will prevent the entrance of worms, which often become troublesome to pine-plants, particularly when the bed in which they are plunged becomes too far exhausted. Over the oyster-shell place an inch of broken pieces of pots, or brick-bats broken small, and over this place an inch of half-rotten turf from the surface of some rich down, or sheep-walk; the broken tiles or brick-bats will act as a drain, to admit of the escape of any superfluous moisture; and being themselves of an absorbent nature, they will imbibe a share of moisture,

which they will impart to the roots when they enter among them. The rotten turf will also afford additional nourishment to the roots, and will prevent the drain under them from being choked up by the finer earthy particles washed down in the process of watering. The roots seem to delight in entwining round the broken fragments of pots, or small pieces of bricks, and will be found, upon examination, to be always in a healthy state, in proportion as these abound in the pots. For larger pots, a greater depth of these fragments should be used, in proportion to the size of the pots. In potting the plants, after the roots are all separated and trimmed, place a handful of mould in the bottom of the pot over the rotten turf, upon which place the plant; and while it is held upright by one hand, with the other fill the pot with mould up to the top, pulling up the plant occasionally, so as to allow the mould to fill all the spaces amongst the roots, as well as to place it at a proper depth in the pot. When it is full of mould, beat the pot upon the potting-bench two or three times, so as to shake the mould more compactly together; do not press the mould too tightly together with the hand, particularly if it be damp; a very slight pressure round the surface will be sufficient, and that merely to regulate the mould to a proper depth under the level of the margin of the pot, so as to leave a space for the purpose of holding water. The plants being potted, give them a slight watering at their roots, merely to settle the mould about them; a more general watering will be given when they are again placed in the bed.

Presuming the bed to be now in readiness for them, which should have been preparing while the shifting of the plants was going on, proceed exactly in the same manner to replunge them, as was directed last month for the fruiting-plants, beginning with the largest and tallest plants in the back row, and so proceeding until the whole be again replaced in the bed; the smaller and sometimes the unpotted crowns and suckers occupying the rows next the front, not only that they may enjoy more light and air, but also be more conveniently got at in the course of the succeeding month, when many of them will require to be potted in mould, and being thus placed in the front, they can be conveniently got at without disturbing

the arrangement of the whole. When the process of plunging is finished, clean out the interior of the house, and leave it in a neat and orderly state. Go over the plants with a sharp knife, and holding the pieces of matting which were used to tie up the plants between the edge of the knife and the thumb, cut them through, and remove them, regulating any leaves that may happen to lie in an irregular position, drawing the hand gently up between them, they will then fall down in their natural position; and this being done, give the whole a good watering at their roots, and in the course of another day or two, if the weather be clear and dry, give the plants a good washing over-head from the syringe, to clear them of the dust or filth which they may have contracted during their shifting.

The plants will now be beginning to grow; the temperature should therefore be kept up to 70°, the times of regulation being generally at six o'clock in the morning and at eight or nine at night. As the weather will now be getting more temperate, and the plants be in a state of active vegetation, air must be admitted during the forenoon of every day copiously. The health of the plants now depends upon a free admission of air, plenty of water at their roots, and frequently over-head, with a steady degree of temperature. The thermometer in the hottest sunshine should not be allowed to exceed 90°, but be kept at and under that point, by the admission of plenty of air. As the plants get established in their pots, and are growing rapidly, every third or fourth day, water should be given at their roots in ordinary quantities; and if occasionally richly impregnated with sheep-dung, the plants will be thereby greatly benefited. Attention should now be particularly paid to the regular steaming of the house every morning and evening, by pouring water upon the flues and floors of the house; indeed, a moist and high temperature from this time till autumn, seems to be the most congenial atmosphere for pines to live in, and in such a climate few insects will visit them.

SUCCESSION PINE-PLANTS.

This department will also now require a similar regulation, as above directed for the nursing-pit. The plants being taken

out, tied, and examined according to the preceding directions, such as require to be shifted should be done in the same way, and placed in pots corresponding in size to their respective sizes and growths; observing not to pot them in too large pots, but rather to calculate upon again shifting them in April or May. Indeed, no such thing as a regular and indiscriminate shifting should take place at any time; for circumstances occur so often in the habits and constitutions of plants, that to attempt to shift them at stated periods, and into certain sized pots, only defeats the object in view. All plants should be provided with larger pots and more nourishment just as they stand in need of it. It is often of much advantage to plants to be taken out of the pot in which they grow, and replaced into one of the same size, and not unfrequently into one of lesser size. The size of the pots must always be left to the good sense of the cultivator. It is, however, of more injury to them to be over than under-potted. In large pots, plants become cloyed with too much nourishment; and as the plant, by its absorbent organs, is unable to extract all the nourishment contained in a large pot, it soon stagnates and becomes sour by being kept too damp, particularly when plunged; as in that state the superfluous water is prevented from passing off through the sides of the pot, which would not be so sensibly the case, if the pot stood exposed on all sides. It is a well-known fact to cultivators, that all plants strike roots most readily when placed next the sides of the pots in which they are planted; and many plants, that cannot be induced by almost any other means to strike root, will emit them by cuttings, when the base of such cuttings rests upon the bottom of the pots, without the least particle of mould intervening. In order, therefore, to procure healthy rapid growing plants, which is the ambition of every pine cultivator, it is necessary to induce them to multiply their roots, and no method appears so rational as growing them in small pots; and as they advance in growth, continue to shift them into larger, taking care not to injure the roots in the operation, but to continue them in a growing state. The plants being shifted, according to their several necessities, they are then to be re-plunged in the same manner as directed for

the fruiting-plants last month, observing to give them plenty of room in the bed, that they may enjoy sufficiency of air and sunshine. The temperature should be kept as steadily as possible from 65° to 70°, and air should be admitted daily, in proportion to the state of the weather; and should the air of the pits become low, in consequence, for a few hours, it will be of far less injury to the plants than if kept more uniform and the stagnant air allowed to remain unchanged.

FRUITING PINE-PLANTS.

This department being regulated as directed in February, little else will require to be done than supplying them with fresh air and plenty of water, both at their roots and also over-head in clear weather, never allowing the steaming to be neglected every morning and evening. There is something so congenial in a fine humid atmosphere to the nature of the pine, that it is seldom found in perfection where this practice is entirely disregarded; and no method appears to us to produce this humidity so readily as that of creating a steam from the flues by pouring water upon them. The plants should occasionally be watered at their roots with liquid manure; as from this time, until they have swelled their fruit nearly to its full size, they will require every nourishment which can possibly be given to them. As they proceed in the formation of their fruit, they will be materially assisted by forming a ring of turf, equal in circumference to that of the pots in which they are placed, two or three inches thick, and this part should be placed upon the top of the pots, and thereby, as it were, increasing their size. The hollow formed by this addition to their size, should be filled up with rich maiden loam, and sheep or other rich dung well incorporated, and this top dressing will encourage them to emit fresh roots from the bottom of their stem, upon which, if there be any useless or decaying leaves, they should be removed; by which means the emission of such roots is facilitated. The temperature of the house should now be gradually raised to 73° or 76°, allowing the temperature in sunshine to rise to 80°, and from that to 90°, during the middle of the day, but not to exceed 90° as a

maximum. If the weather be dull and cloudy, it may be necessary, by aid of fire-heat through the day, to raise the temperature at least to 80°; at which it can be regulated for a few hours daily by the admission of air. It is necessary thus far to imitate nature by keeping the temperature throughout the day, either by sun or fire-heat, several degrees above the night temperature; for nothing can be so injurious to any plant in an artificial climate, as to keep up a high temperature during the night, and upon the first sight of the rise of temperature by sun-heat to throw open the house, thereby keeping nearly an equality of temperature day and night, or rather keeping the temperature of the night higher several degrees than that of the day, whereas the very opposite ought to be the case. This circumstance was not unnoticed by that great physiologist Mr. Knight, when his attention was particularly directed to pine growing; and his observations upon this very subject, are more rational and just than almost any other of his directions for cultivating the pine.

FORCING PEACHES.

By the beginning of this month the peach-trees will be in blossom, if the directions laid down in the preceding months have been properly attended to. The temperature now should be gradually raised from 52° to 55°, at which point it should stand about the second week in the month, and remain at that temperature during the remainder of the month. Air should now be freely admitted to strengthen the peach-blossom, and ensure their setting, not only by adding to them strength, but also by assisting in the dispersion of the farina, or male fertilizing dust of the anthers, or male parts of the fructification, upon the female organs; for without such impregnation the blossom would prove abortive, and no fruit would consequently follow. The trees, during the period that their blossom is expanded, cannot be supplied with water by the syringe so bountifully as previous to their expansion, therefore the steaming of the house should not be neglected; for although any superabundant supply of water, either at their roots or over their branches, would materially injure the more delicate

parts of the fructification, a dry close atmosphere would be equally injurious. The fine dews produced by the simple operation of steaming, will keep the plants in vigour and strengthen their bloom, until the fruit be set, which will be accomplished in a few days after the blossom has attained its full size, and will be readily ascertained by the young fruit appearing like a small swelling at the base of the style, or female organ. All the blossoms in the house will not, however, set at the very same time, a few days allowance must be made for such parts as are more remote from the glass or heat; but when the fruit has evidently set, the application of the syringe should be again had recourse to. The first two or three days of syringing, the quantity given should not be large, and should be applied with the finest cap upon the syringe, so as to resemble a strong dew more than a rain. When all danger is over of injuring the young fruit, or the late expanding blossom, the second coarser cap should be put upon the syringe, and the water given with some force to displace the remains of the decayed bloom, and to clear the trees of dust and the first symptoms of insects, which will be sure to make their appearance before the leaves have attained half their size. It is of much consequence to suppress these intruders at as early a period as possible; thereby preventing them from getting a-head and injuring the trees in their most tender state.

The red spider will be entirely subdued and completely kept under, by a timely and unsparing application of water from the syringe, using it from the right-hand end of the house, and again from the left, so that both sides of all the leaves may be subjected to its effects; this will destroy those which are already formed, and so completely derange their webs upon the back of the leaves, that they will not be likely again to make their appearance; and should they even gain possession, a little sulphur may be sprinkled upon the flues when at the greatest heat; but this must be done with great caution, from fear of injuring the tender foliage. It is generally the few days on which the watering is suspended in consequence of the bloom, that enables the spider to burst into existence, while the leaves are rather dry; but after the watering is resumed, it will be an evident sign of a deficiency of that element if the insect

makes its appearance again, at least until the watering be again suspended, while the fruit is ripening. When it makes its appearance only in parts of the house, and not generally, a little sulphur may be ignited under the parts affected; but, as remarked above, this must not be done in a careless manner.

The green fly will also make its appearance, whether the watering be supplied in sufficient abundance or not; and such as are left, after being once picked over, (such shoots being as well removed, if they can be spared, after being once attacked by them) will be readily destroyed by fumigation with tobacco. As prevention is always much better than the best remedy, it will be adviseable to give the trees a slight fumigation twice a week, from the time the first wood-buds break into leaf until all danger of their attacks be over, which generally takes place when the leaves have attained their full size, and are become rather hard and strong, the tips of the shoots then only being subject to these enemies, which can in many cases be cleared by the hand; or the evil may be remedied by applying a little smoke from a common tobacco-pipe, blowing it from the bowl close to the shoot infected, or from the fumigating bellows.

When the young fruit has attained the size of full-grown peas, the process of disbudding should be attended to, for which see *The Fruit Garden.* No thinning, however, of the fruit need take place this month, at least not until the end of it. Water must not yet be too profusely given to the roots until the fruit has begun to take its first swelling, as it is generally termed by gardeners, and even then, not in so great a quantity as to sour the borders or keep the roots too damp; for, until the fruit has formed their stones or kernels, any unnecessary supply of moisture would be apt to make them drop off. The borders, if not mulched with rotten dung, should once a week be watered with the draining of the dunghill, or liquid manure; and this being moderately supplied, in addition to such as falls from the trees in syringing, and from the flues while steaming, will generally be found sufficient, unless near the flues, which should be kept moist.

FORCING VINES.

The directions laid down for the management of this department last month being adhered to, the same should be continued until the vines come into bloom. After that time, the temperature should be increased to 75°; and the process of watering the borders and steaming the house, by pouring water upon the warm flues, should now be particularly attended to, so as to keep the house in rather a damp than a dry state. As vines are found to set their fruit best in a high temperature and moist atmosphere, the steaming becomes therefore the more necessary, particularly at this time, as it would be dangerous to use the syringe upon their branches until the fruit be set. The parts of fructification in vines are so small, that to an inattentive observer they are out of flower, and their fruit set before they are remarked; the application, therefore, of water by a syringe, or in any other manner than by a process of steaming, would be liable to injure, if not totally destroy the tender parts of the blossom.

Air need not be so freely admitted now as formerly, nor as will be necessary at a future period; a moderate circulation by the sashes or by the ventilators will be quite sufficient, observing to admit it only by small openings in cold windy weather. Ventilation is not best effected by opening the sashes or ventilators at any time, to any great extent, for if the top part of the sashes or top ventilators be only opened a few inches, and the lower ones in about the same proportion, the heated air, which is confined chiefly to the top of the house, will rapidly escape, as, in consequence of its being heated, it is much lighter than that of the atmosphere, and the atmospheric air will rush in from the front or lower ventilators, to fill up the vacuum produced by the escape of that which is lighter, and which has escaped at the top of the houses. Thus a sufficient change of air is effected without opening the house at any time to any great extent.

As the young shoots advance, they must be regularly examined and pruned; those which have pushed a few joints, and have shown one or two bunches, should be stopped at

the second joint above the fruit; which stopping is performed by pinching the tender shoot asunder with the finger and thumb. All necessary pruning in the vinery or peach-house during summer, is to be effected in a similar manner without using the knife, by which a bruised wound is produced, which is not so apt to bleed as one which is produced by the cut of a knife. It is on this principle that gardeners are in the constant habit of bruising the shoots of melons and cucumbers with the finger and thumb, after pruning them with a knife, to answer the same purpose; and this method seems to have been practised for an unknown length of time. Such shoots as produce no fruit, and are not intended to be retained for a supply of young bearing-wood for the succeeding year, are to be rubbed off quite close to the old wood from which they issued: thus clearing the vines of all superfluous and useless wood, which, if not removed, would rob the necessary wood left for succeeding purposes, as well as materially injure the crop, and cause a great degree of confusion.

The shoots to be chosen for the production of the crop next season, should be now selected from the strongest and best-formed shoots having no fruit, and which, from their luxuriant appearance, are likely to attain considerable size: these should be tied into the trellis as they advance in growth, to prevent them being broken, and so arranged as not to crowd the rest of the shoots of the vines. All shoots that spring from the old wood should be entirely displaced, as well as some of the more weak of those which have shown bunches of fruit, if there be plenty of stronger near them, so as to prevent all unnecessary confusion and shade. The vines will require to be gone over every other day, until all the shoots have extended so far as to determine whether they are to produce fruit or not; and this examination will require to be continued for some time after the fruit has set, as such shoots which have been shortened will be apt to throw out lateral or side shoots, which should be removed above their first joint from the fruit-bearing branch.

In tying the fruit-bearing shoots to the trellis, but more particularly the shoots intended to remain for next season, observe to allow plenty of room in the matting to allow the

shoots swelling to twice the size which they may have now attained. The tendrils, which are meant by nature for the vines to support themselves when growing naturally, are useless in the vinery, and only tend to create confusion, they should therefore be all pinched off, in order that they may not rob the fruit of any of their nourishment.

The opinions of practical and experimental men differ widely in regard to the best mode of training the vine; but in whatever way it is or can be trained, it is of much less consequence to the production of good crops than its other general management. To have good grapes, much more depends upon the soil in which they are planted, and the climate in which they are kept, than in any particular mode of training. That mode which tends the least to confusion, and at the same time admits of a constant supply of young bearing shoots into the vinery, is decidedly the best, every advantage being combined in it; while, at the same time, it is exempt from that confusion which attends other methods of late years extolled by horticultural writers, and which are not calculated to produce any better effect. A greater variety of training may be indulged in on the open walls; but as the object in all vineries is fruit of the best quality, we see no better method than training the shoots directly up the roof, for, by this means, a good gardener will always be able to provide a regular supply of young wood in every part of his house; whereas a novice may adopt any plan which he fancies, without attaining the desired object.

FORCING CUCUMBERS AND MELONS.

The cucumber and melon-plants now showing fruit, will require great care and attention, as advised last month. Particular care must be paid to set or impregnate all female flowers as they appear; for, without this assistance, many would damp off, and others would grow of a deformed shape, for want of that necessary assistance. This is more particularly to be attended to as regards melons; few, if any of them, will come to perfection without being impregnated. At a more advanced

period of the year, this precaution is of less importance, particularly to cucumbers, as many insects, and bees in particular, will be in active quest of food, and will, while flying from flower to flower, perform this necessary office. The state of the beds will require daily attention, so that a brisk growing heat may be kept up, in order that the plants may not sustain any check, which to them, at all seasons, is extremely injurious. This heat, though brisk, must be moderated according to the state of the weather. The cucumber-plants ridged out last month, as directed, will now be beginning to produce fruit in perfection and abundance.

As the heat begins to decline, let linings of prepared fresh dung be applied, or the linings, if any have already been applied, should be renewed as circumstances may direct.

Air should be freely admitted every day, in quantity more or less, as the state of the weather and the temperature of the beds may direct; and water should be likewise administered frequently, but in a moderate quantity, always using the precaution to have the chill taken off before using, either by its being placed in the beds some hours previously to its being used, or rather by the addition of a portion of water heated for the purpose. The operation of watering should be performed in the forenoon, and, if possible, in fine days, from ten to one o'clock, so that the plants may be partially dried before the beds are shut up for the night. The frames will require to be carefully covered up every night with mats, and this covering removed by sunrise, or soon after, in the mornings. As the plants extend themselves, let their branches or runners, as they are called, be pegged down to the mould, at regular distances, to prevent their running into confusion, as well as to strengthen the plants, by allowing them to root at the joints of their shoots, by which means they will obtain additional nourishment. As the roots penetrate through the hills, add more mould to them, always adding a little at a time, and having it placed in the beds a day or two before it is applied to the roots, so that it may be brought to an equal temperature to the mould in the beds.

It is of much consequence that the mould applied at all

times be well broken, and moderately dry, before it is brought into the beds; for which purpose, it should be kept in a dry shed, or other sheltered place, to be always in a fit state.

The melon-plants planted at the same time will not be so forward as the cucumbers, but they will now, if every thing has prospered, be in want of additional mould at their roots, and their runners will, as they extend themselves, require to be pegged down in the same manner; accordingly as the mould is applied to the melon-plants, let it be well trodden or beaten compactly round their roots, and let all appearance of mouldiness or damp be removed, by frequently stirring the surface, and displacing any dead or injured leaves. As the flowers are set or impregnated, let a small piece of tile or slate be placed under the rudiment of each fruit, which will greatly prevent their damping off.

Successional crops of both cucumbers and melons will also now be required to be ridged out from plants raised from seeds sown last month; accordingly, as such plants appear fit for planting out, let beds be prepared for their reception, as directed last month, and for latter crops, seeds should now again be sown, at least twice during this month. Beds made from this time forthwith, need not be so strong as those already put up; from three to three feet and a half will be quite sufficient.

For those who only desire to have cucumbers or melons to cut by the beginning of May, or towards the middle or latter end of that month and the beginning of June, this is a good time to sow the seeds, and the success of those which are sown at this time, may be calculated upon with greater certainty than upon those which are sown much earlier. For general crops for summer use, this is the best time to sow, as those which are sown at this time will continue bearing the greatest part of the summer and autumn months; the cucumbers coming in, in June, and the melons in July and August: the only months in which melons can really be had in perfection. Towards the end of the month, seeds of both these fruits may be sown, for the purpose of being ultimately planted out under hand or bell-glasses. The plants from seeds sown at that time will be fit to plant out, where they are to remain, by

the beginning of May, and the cucumbers be fit for use in June and July, and the melons will be ripe in August.

HOT-BEDS FOR FORWARDING CULINARY PRODUCTIONS.

Slight hot-beds of leaves, or dung and leaves, may, by the beginning of the month, be put up for forwarding early crops of potatoes, carrots, French-beans, cauliflower-plants, celery, broccoli, &c. The potatoes, turnips, and carrots, to be left to produce their crops upon the beds, and the French-beans, cauliflower, broccoli, celery, &c., to be transplanted into the open borders to come to perfection. If the autumn-sown crops of peas or beans have failed, they should, by the beginning of this month, be forwarded upon slight beds in the same manner; and as these crops are found to be improved by transplanting, the loss may be readily remedied. In sowing peas upon hot-beds, cover the bed with turf cut into small pieces, as hinted at in the Culinary Garden, which will enable the operator to remove them from the bed to their place of intended growth, without injuring their roots or checking their growth. Capsicums, basil, gourds, vegetable-marrow, lettuce, love-apple or tomato, marjoram, savory, &c., should now be sown upon slight hot-beds, to be forwarded in their growth, and to be afterwards transplanted out into situations suited to their respective habits.

FORCING SALADS, &c.

Radishes of different sorts, mustard, cress, rape, chervil, and all kinds of salad-herbs, should be sown in succession upon slight beds till the beginning of April, after which time they will succeed sufficiently well in the open air.

FORCING MUSHROOMS.

Mushroom-beds may be now put up in the mushroom-house, or indeed at any time in the year; however, this month and September are generally preferred for that purpose. (For *Mushrooms*, see *Culinary Garden.*)

APRIL.

NURSING AND SUCCESSION PINE-PLANTS.

The plants will now be in a rapid state of vegetation, and will require plenty of water at their roots, once in three or four days, occasionally giving them a supply of liquid manure, as already directed. They should also be frequently syringed over-head with clear water, both to refresh their foliage and to keep them clear of dust. The constant steaming of the pits should also be attended to. The temperature should be continued as regularly as possible, at the same degrees as directed last month. Air must be freely admitted at all times that the state of the weather will permit; and if any of the plants, which were not shifted into larger pots last month, appear now to be in want of removal, they should be carefully taken out and the required shifting given to them, and afterwards replaced in the bed.

FRUITING PINE-PLANTS.

Water at the roots must now be given in a plentiful manner, every second or third day, in order to swell off the fruit to a good size. The application of liquid manure should also be given once a week; but when this is applied, it is to be understood as answering the purpose of watering. If any of the pots that appear to require it, were left last month without a top dressing, as there recommended, it should now be done, particularly when the pots happen to be too small for any of the plants, or where there is a particular fine fruit upon a weak plant. This addition to the nourishment of the plants will be obvious, and is the only means of assisting them in that respect at this period of their growth, as shifting them might be attended with danger, and the roots will now probably have penetrated through the holes in the bottom of the pots, and have extended themselves considerably in the de-

composed tan or leaves of which the bed is composed. The plants have not only now to support their fruit, but also to nourish suckers, which will be fast forming, and which, when formed, make rapid progress in their growth; as these suckers are one of the modes by which the pine propagates itself, they cannot be dispensed with, unless on particular occasions, such as that of an unusually fine fruit appearing; in such a case, the lesser evil may be chosen, namely, that of destroying the offspring suckers, in order to promote the growth of the fruit. This is, however, seldom done, at least to any extent; the young plants always being considered valuable. Some varieties of pines are liable to produce small suckers upon the footstalk of the fruit, which, as they seldom are of much value, should be rubbed off as they appear; for, if left on, they would rob the fruit of a considerable portion of nourishment. The different varieties of sugar-loaf, the king, and the brown Antigua are particularly apt to produce small suckers of this kind; and these have been by gardeners denominated *gills*. When more than two or three suckers appear upon one plant, which has a large fruit, it is adviseable to destroy them, as the increased size of the fruit, and the remaining two or three well-grown suckers will be sufficient produce from one plant. When the fruit is of inferior size, then the suckers may be permitted to remain to the number of six or seven; more than that cannot be well brought to perfection upon one plant. Such suckers as issue from the roots should be generally destroyed, as seldom making good plants. But if the increase of the stock of plants be the object, all suckers of the stem, and some of the best of those from the roots, should be encouraged. Those from the roots are more apt to start into fruit in a premature state, than those which are formed upon the stem of the plants, and are therefore of much less value.

Many gardeners prefer crowns to suckers, as making the best plants; others are of a different opinion; amongst the latter was Speechly, who was the most successful cultivator of this fruit in his day. "Suckers," he says, "are preferable to crowns, being generally of a much larger size; the goodness of either does not at all depend on the length of their leaves, but on the substance of their stems at the bottom. I have

sometimes had crowns that measured at their bottoms more than nine inches in circumference; and in such a case, they were almost equal to any suckers."

FORCING PEACHES.

The temperature should be continued as regular as possible at 55° of fire-heat, allowing an advance during the middle of each day by the sun-heat of 5° or 10°, but not exceeding that point. Air should now be more freely admitted, upon all occasions, by opening the sashes or ventilators, to prevent the young shoots being drawn up weak, and consequently unfit for forming buds for succeeding crops. This should be more attended to in the peach-house than in any other of the forcing departments, as the peach, from its habits, is impatient of close confinement; and the shoots, if drawn up weak, will become a prey both to insects and diseases more readily than vines or pines, which, being much more hardy in their nature, will not suffer so much nor so soon from those causes. The fruit should be thinned when of sufficient size to show the formation of the stone when cut through the middle, and before the stones have attained a grisly hardness. This thinning, however, should be cautiously pursued at this time, and the final thinning left until the stones be fairly formed.

When the trees assume a sickly or weak appearance, the quantity of fruit taken off should be greater, as by removing the superfluous fruit at an early period, the trees will consequently be less exhausted, and that portion of their strength, which they would naturally give to their fruit, be directed into their wood, and consequently the strength of the tree would be increased. This thinning of fruit of trees in a sickly or weak state is pointed out to us by nature, particularly in the case of the peach-tree. It is the first effort made by nature to recover itself, if reduced to a low weak state by immoderate bearing or in the case of bad management, by shedding more or less of its fruit, and sometimes the whole; and it is also observed in almost every other fruit-bearing tree, by shedding the superfluous fruit, which it finds it is unable to bring to perfection. Of this we are often apt to complain, par-

ticularly when they shed the greater part of their fruit; but nature is thus relieved, and that health restored or preserved, which, if the fruit had not fallen, would in many cases have rendered the tree for some years unfit for future crops, and probably deprived it of life altogether. Trees more strong and luxuriant than may be desirable, may be allowed to carry a greater crop to exhaust themselves to a certain degree, and thereby acquire habits of more moderate growth, which will be more likely to continue them in a regular fruitful state for years, than if allowed to continue in a gross state of growth. This cannot be effected by pruning away the shoots, as in that case it would only tend to produce greater luxuriance. Laying in more wood, pruning little, and taking larger crops off them than off such as are of less gross habits, will corrrect this habit of luxuriance in most trees.

The trees should be now disbudded or divested of all superfluous wood, leaving only such as will be really required to be laid in for the next year's crop. This early pruning will materially contribute to the health of the trees, and enable them to make such wood as will be productive of future crops, and give every chance of producing in high perfection the crops of the present year. This practice of disbudding is too little attended to by many gardeners, from a mistaken fear of taking too many off; but it is much better to have a few fine healthy shoots than to have the trees crowded with a vast number of meagre shoots not thicker than straws, and which will require to be cut out in the winter pruning, being unripened and weak, and all this at a considerable sacrifice of the strength of the trees. Those shoots which are selected to remain, should be neatly and regularly laid in to the trellis, and this should be done as they advance, to prevent them being broken by the effects of watering, or other accidents, besides giving the trees a much better appearance. In tying those branches to the trellis, care should be taken not to tie them too tight, but to allow as much room between the shoot and the matting as would admit of another shoot of the same size along with it. If this be not attended to, the shoot swelling in size will be confined for want of sufficient room, and the consequence will be, that the shoot will be cut almost through, and lay the

foundation of a disease of the most dangerous nature. Peaches, of all trees, are the most sensible of external injuries; and when the shoots are injured by this, or any other cause, bleeding ensues, and gum and canker follow.

Water may now, as the fruit advances, be more liberally supplied to their roots, but still (as remarked last month) with due caution. The operations of the syringe should go on with unremitting assiduity, to keep down that dreaded enemy the red spider, and to refresh and nourish the leaves. Steaming should also be attended to, for the same purpose. The green fly, if the hints given last month be duly attended to, by once or twice a week using a slight fumigation of tobacco, will be kept entirely down. If it be once allowed to get a-head, it will require three times the expense to subdue it, independently of the injury done to the trees.

The coccus sometimes makes its appearance, but (if not in immoderate quantities) it is apparently injurious; where, however, they can be removed, it is as well to do so, but their final removal will take place when the trees are undergoing their winter pruning and washing. The males of these insects having wings, may be dislodged by the application of water, thrown upon them with some force; but as the females are stationary, they can only be rubbed off with the finger, or by similar means.

PEACHES ON HOT WALLS.

Peaches are not unfrequently planted against hot walls, and where properly managed, they cannot but be considered as extremely useful, as forming that link of connexion between the forcing-houses and the open walls, and thus ensuring the ripening of the finer and later kinds of peaches and nectarines in cold wet autumns, in the most favourable situations, perfecting, at the same time, the earlier or middle-class of peaches and nectarines, in situations where the climate is not sufficiently congenial for their production without such assistance. All garden-walls of southern aspects, should be built hollow, or with flues, so that they can be used when occasion requires; and as there is no extra expense in the first erection,

such walls also should be so built that have eastern and western aspects also. These latter, however, will not be of general utility, unless in warm situations in the north, and in all situations in the south of England. This species of forcing has been practised by many to an injurious extent; and, instead of doing good, has done much harm to the trees, by an injudicious application of the means that otherwise would have been of the utmost benefit to them; for this reason, few hot walls have been built of late years, and many that have been so constructed have not been used.

Trees planted against hot walls are not to be considered as to be forced, but to be assisted in bad situations and unfavourable seasons. The failures, therefore, hitherto experienced, have originated in the want of due caution being paid to the times of applying heat and the quantity so applied.

"Fire-heat," says Nicol, "should never be applied to naked walls in the spring, so as to force the plants, which should be allowed to vegetate of their own accord, to flower and to shoot. But, after vegetation has commenced, and when the flowers, foliage, and infant fruit are in a perilous state, if bad weather overtake them, the help of the flues may be called in, and they may be employed in an auxiliary manner for their defence. If further aided by the application of nets, or of canvas screens, (*see Protecting Blossoms, in Fruit Garden*) their mutual help might, with proper attention, be reckoned upon as the sure pledge of a crop, and of well-matured fruit. The fires, if any be made at this season, should be very moderate. The flues should never be heated so as to feel much warmer than the hand after being kept in the bosom for a few minutes; that is to say, they should seldom be above blood-heat, or what is termed milk-warm."

Much injury may be done by attempting to force these trees placed with one side against a hot wall, while the other side is exposed to all the vicissitudes of the season. The greatest use of hot walls, and which is really of considerable importance, is their assistance in the end of August, September, October, and the beginning of November, in forwarding the maturation of the fruit, and ripening the wood. The trees upon such walls, if fire-heat be applied to them, will require to be plen-

tifully supplied with water during the whole time such heat is used, for the suppression of spiders and refreshing of the foliage.

Hollow walls, heated by Mr. Atkinson's hot-water system, will be much less liable to accidents from over-heating, as no such occurrence can possibly take place where hot water is applied, and the distribution of heat is so uniform, that all parts of the wall will be heated to the same extent, which is not the case where hot-air or smoke-flues are used.

FORCING VINES.

The temperature in the grape-house should be continued with regularity, as near to 75° as possible; and if success have attended the management, the fruit will be set by the beginning of the month, and be swelling fast towards the end of it. Larger quantities of water should now be regularly given to the vines at their roots, and occasionally liquid manure should be applied to them also, both to their roots within the house and to the border without, as far as the roots may reasonably be expected to have extended themselves. This sort of manure is highly beneficial to the vine which is termed a gross feeder, and from the weight of its fruit, the number and length of its branches, it seems to require, at first sight, a greater share of nourishment than any other plant which inhabits our forcing-houses. The great fertility of the celebrated Hampton-Court vine is said to be principally owing to the roots having extended themselves into a common-sewer, in the vicinity of the garden; and numerous similar accounts are given us of vines, celebrated for their great productiveness, deriving supplies of nourishment from less delicate sources.

However, a great weight and quantity of grapes are not always to be preferred, particularly when the means used to acquire that weight and quantity are prejudicial to the flavor of the fruit. Grapes, less luxuriantly fed, are generally acknowledged much higher flavored, and possessing a great degree of saccharine matter, of which larger and more showy berries and bunches are deficient.

However, in the earlier stages of their growth, liquid manure may be applied to their roots; but it should be discontinued when the berries are about one-third of their size. Clear water should be supplied to them until they have nearly attained their full size, gradually withdrawing it as they begin to color; from which time none should be given at their roots, unless the borders are very dry indeed, and even then with a sparing hand; the syringing of the leaves should also be abandoned, as it is sure to destroy the fine rich bloom upon the berries.

But at this period of their growth, now under consideration, water from the engine should be applied abundantly over their leaves, to suppress or destroy the red spider; which, without this precaution, would be highly detrimental to the foliage. Water, thus applied, should be sent out with considerable force, first from the right-hand end of the house, and then from the left, so that both sides of the leaves may be thoroughly scourged with the water once every day, and in warm days once in the morning, and again in the evening. The house should be regularly steamed every evening, according to directions previously given. The green fly seldom attacks the vine as it does the peach, but the thrips are often found curled up in the leaves; which, on account of their perforating them in thousands of holes, soon destroy them, and cause them to assume a shrivelled and dead appearance. When these enemies make their appearance, the fumigations of tobacco must be had recourse to.

The utter destruction of both the red spider and thrips should be completed before the fruit attains its full size, and particularly before it begins to color, as the agents employed for their destruction, tobacco, fumigation, and water, cannot be then applied without injury to the fruit.

The directions noticed last month regarding pruning and training in the young wood, must be duly attended to throughout this month, in order to prevent any unnecessary waste of the strength of the vines by producing shoots, only to be taken off either soon or at the winter pruning, as well as to prevent confusion and too much shade, into which the vine, from its habits of rapid growth, is subject to run.

Those shoots which are even intended to be left at some length at the winter pruning, should be stopped after they have exceeded the required length that they are ultimately to be; that is to say, one-third, or rather more, should be stopped back a few joints, so as not to run up and crowd the other parts of the house. All lateral shoots, and such as issue from the old wood, together with all tendrils, should be removed as useless, and only robbing the vine, as well as causing confusion; leaving only the tendril next the extremity of those shoots which are laid in at the greatest length. Any leaves broken or injured by accident, or destroyed by insects, should be also removed, but none of the healthy leaves should be ever taken off, as the vine thereby becomes so much weakened, and when this practice is carried too far, the ill effects often appear in the shrivelling of the fruit before it attains maturity: this is most obvious in the tender kinds of vines, such as the Frontignac, and some others; while the hardier kinds, such as the Hamburg, &c., are less effected by it. Air should be admitted freely every day by opening the ventilators or sashes more or less, according to circumstances.

It is wisely observed by Nicol, that a man to be a good trainer of vines, and to be able to provide for a crop the following season, must have some forethought, and be capable of making his selections as the plants shoot, even at this distance of time. It must be pre-determined how he shall prune, and where he shall cut at the end of the season, and so, as it were, fashion the plants to his mind. He has this more effectually in his power, with respect to the vine, than any other fruit-tree, on account of its rapidity of growth and docility.

Such shoots as may have been stopped, as directed above, will be apt to push again. Allow the lateral that pushes to run a few joints, and then shorten it back to one, and so on, as it pushes, until it stop entirely. When the proper shoot from which these issued becomes ripened nearly to the extremity, the whole of the said laterals may be cut off at the originally shortened part, or at one joint above it, if there be reason to fear that the uppermost bud of the proper shoot will start.

FORCING CUCUMBERS AND MELONS.

Cucumbers and melons should now be kept in a growing state, and plentifully supplied with heat, air, and water. Examine the heat in the beds frequently, and as it begins to decline, let it be renewed by the application of fresh linings, or by renewing such linings as may have been already applied. Air should be freely admitted every day, in a greater or less degree, accordingly as the weather is favorable or unfavorable, by tilting up the sashes, or by drawing them up or down a few inches, giving and reducing it by degrees, as the state of the weather may direct; taking care to shut them up in the afternoon before they become too cool, and that they may regain a few degrees of heat to keep them sufficiently warm during the night. The mercury should not be allowed to rise in the thermometer during sunshine above 70° or 72°, but air should be admitted to keep it at or near those points; and by shutting up at an early period in the afternoon, this temperature will be kept up for a considerable length of time. Water should be applied liberally from the rose of the water-pot every two or three days, generally watering in the afternoon about three or four o'clock, but in dull cloudy weather it may be applied earlier; care, however, must be taken that it is not applied when the sun is powerful, as the leaves would be scorched by his rays acting upon the particles of water upon them. It will still be necessary to have the chill taken off the water before it is applied to them.

At this season, cucumber-plants are sometimes infested with the green fly, and also with that much more troublesome enemy the thrips; if either of these make their appearance, recourse must be had to fumigation, which will soon rid them of both these troublesome enemies. From the mode of cultivation, the red spider seldom invades them, as it is only in dry warm atmospheres that that insect exists, and which are extremely unfavorable to the growth of the cucumber. A mild humid heat is that in which they are found to prosper best, and in such the red spider seldom makes its appearance. As the plants extend their shoots, the mould should also be extended, and should now be made good all over the beds; the vines

should be closely, neatly, and regularly pegged down to it. They should also be moderately thinned, if they be too thick and crowded, with the view to prevent confusion, as well as to avoid weakening the plants with a superfluity of useless shoots and leaves. This thinning or pruning should, however, be cautiously done, a little only at a time being removed, and as they are apt to bleed, they would be much weakened if too much be cut at once. All bruised, damped, or decayed leaves, should be carefully removed as they appear, and no weeds suffered to grow in the beds; if this be not attended to, damp will naturally be engendered, and will at all times be very injurious to the plants.

It not unfrequently happens, that the leaves of the plants will flag or droop, particularly if hot sunny weather succeed dull cloudy days; and when such occur, let recourse be had to a slight shading, either by throwing a thin mat, or sprinkling a little dry hay, straw, or litter over the glass, but this shading should be removed as soon as the sun becomes less powerful.

Towards the middle or end of the month, if the weather be mild, ridges should be put up, upon which to plant out both cucumbers and melons, to be perfected by the protection of large bell or hand-glasses; however, unless in favorable situations, melons will not succeed so well without the protection of frames and lights, in addition to dung-beds. Cucumbers will be found to succeed in most situations in this manner, if protected till the end of the month; after which time, they will succeed well without any covering, except, for greater security, a few mats may be thrown over them every evening till towards the end of May, when they may be dispensed with. In forming these ridges, they should not be sunk under the surface, as is most frequently done; for, by being sunk, it will be impossible to refresh the heat, should it be required, by the application of linings. If it be intended to have many grown in this manner, it is advisable to put up the ridges or beds parallel to each other, from three to four feet apart, and the ridges may be of the width of three feet each. When the heat begins to decline in the ridges, the space between them may be filled

up with dung or leaves, sweepings of lawns, or any vegetable substance capable of affording heat by means of fermentation. This will not only add to the heat of the ridges, but will also increase their surface for the plants to be trained upon. If the directions formerly given have been attended to, as far as regards sowing successional crops of seed of these plants in pans or pots placed in the beds in a more advanced state of growth, there will be by this time an abundance of young plants, fit for planting out upon these ridges. As soon as the ridges are put up, about the height of two feet and a half and three feet broad, and the heat sufficiently up, let their whole surface be covered with mould, such as is used for cucumbers in the pits or frames; and for melons, mould should be used of a stronger quality, as has been already noticed. This covering of mould should not be less than ten inches thick over the whole ridge, and where the plants are to be placed it may be fifteen, laying the whole in a sloping manner, both to throw off superfluous water, and to expose the plants to a better angle to the horizon; the mould afterwards to be increased in depth as the roots of the plants extend themselves.

In planting out the plants, let three be placed in each hole, as has been directed for ridging out in the hot-bed frames, and each patch of plants or holes, as they are termed, be placed at the distance of three feet and a half apart, exactly in the middle of each ridge. When the plants are put in, give a gentle watering (the chill being previously taken off) to settle the mould round their roots. Place over each patch, or hole, a large bell-glass, or hand-glass, which may be shut down close for the first day or two after planting, to encourage the formation of fresh roots. If the weather be clear, and much sunshine, let each glass be shaded until the plants have taken root in the fresh mould: this shading to be only used during sunshine, and removed when all danger of its power is over. They will require to be covered with mats every evening till towards the end of the month, or probably till the middle of the succeeding one, so as to guard sufficiently against cold, damp, or frosty weather; for if they be checked with cold at their first setting off, gum, canker, and

many other diseases will follow, which may not be easily extirpated; no family of plants being so impatient of checks of this kind as those of the melon and cucumber tribe.

Their general management on ridges varies not from that of the same plants in hot-bed, with this difference only, they will require to be more sparingly supplied with water, particularly until they be fully established and the season sufficiently mild; after which they will require, in dry weather, more copious supplies of that element than such as are in close boxes, being more exposed to the drying effects of wind and sunshine, and growing in an airy open atmosphere, they will be able to digest a greater portion of that necessary element.

If the plants have not been previously stopped or topped, it must not be omitted at their planting out. This operation should be performed when the plants have two or three leaves, in the manner already directed. Each plant thus stopped will send out two, three, four, or more runners; and these runners, if no fruit appear upon them, (but this is not often the case,) should be stopped in the same manner when they have extended to three joints. This stopping of the shoots should be constantly performed until fruit appear; afterwards they may be allowed to extend to a considerable length, and if not checked by bad management, will continue to send out lateral shoots naturally, which shoots will produce an abundance of fruit.

When the plants have been planted out two or three days, air should be admitted gradually; beginning by merely placing a piece of chip or slate under the edge of the glass, and afterwards increased to the full thickness of a brick upon its edge. When the vines or shoots extend themselves beyond the boundaries of the glass, they should be permitted further to extend themselves freely, by placing a brick under each corner of the glass, so that the shoots may have free egress under them; but the glasses should not be entirely removed from over the roots until the end of June or July.

The general management of melons differs little from that of the cucumber, with this distinction only, that, to have them in perfection, they require a higher temperature throughout their whole growth, for the strictest attention should be paid

to the state of the heat in the beds, and upon the first appearance of any decline in the heat, the linings should be renewed, or made entirely fresh. Accordingly as the shoots extend themselves, they should be stopped, as already directed for cucumbers, and carefully trained down to the surface of the beds; a certain portion of mould should be added as the roots begin to make their appearance through the hills, and as it is progressively applied, it should be well trodden or beaten in a compact body. Care must be taken that no damp nor mouldiness appears in the beds; and to guard against this evil, the surface should be kept clear of weeds, and stirred frequently up to the depth of half an inch, and all decayed or dead leaves carefully removed. Melons suffer much more from the loss of leaves and hard pruning than cucumbers; and when it is necessary to remove either, let the end of the shoot or foot-stalk of the amputated leaves be squeezed between the finger and thumb, so as to bruise the ends of the vessels and prevent a too copious bleeding.

The vines, or runners, should be carefully pegged down close to the surface, by which they will not be liable to be displaced, nor will they rub against each other, which might be productive of wounds, which, if not attended to, would produce canker; and this happening to a principal branch, would endanger its total loss. This circumstance happens not unfrequently, when the vines have almost filled their allotted space, and their share of fruit set and fast swelling.

When a canker of this kind occurs, from damp or wounds, a little unslaked lime or chalk, finely pounded, and laid over the wound, will tend to dry up the damp; but if canker arise, from want of sufficient heat, which is not unfrequently the case, the crop stands in great danger of being spoiled; and should the fruit, by a renewal of the heat, be brought forward, it will neither be handsome nor well-flavored.

Mr. Knight, in the *Hort. Trans.*, sensible of the injury which melon-plants sustain by losing their leaves, recommends that the utmost care be paid to their preservation, and insinuates that their leaves should never be displaced from their natural position, even by the process of watering with a coarse rose watering-pot; but he recommends that the water be ap-

plied by a watering-pot without a rose, and carefully placed between the leaves, so that the mould and roots may be supplied without injury to the leaves. The same intelligent horticulturist also recommends growing melons in large pots, either placed in pits, frames, or forcing-houses, and training the vines or shoots to trellises. We, however, can perceive little benefit to be derived from growing them in pots, either in pits or frames, seeing that they succeed so much better when they are planted out in them; but where convenience admits of it, they may be successfully cultivated in large pots, similar to cucumbers, in forcing-houses of sufficient temperature. The idea of training them to trellises is good, and may be practised in either pits or frames with advantage, or, which will answer the same end, and be more readily applied, they may be trained to laths, placed at a little distance from the surface of the mould, and additional laths applied as the plants extend themselves; or trellises may be formed in convenient pieces, to be used in a similar manner. Some gardeners practice covering the surface of the beds with slates, tiles, sand, gravel, &c., and some cover it with moss: neither of these modes is advisable, as the reflection of the rays of heat from such bodies will render the plants in danger of being first infested by the red spider, and finally destroyed either by them or the too powerful effects of the rays of the sun. "By mossing the surface," Nicol justly observes, "the indolent may find a pretext, as it no doubt in some measure lessens the labour of watering; but it is wrong to pursue that method, in so far as it harbours and encourages the breeding of various insects; and as the fruit approaches to maturity, taints it with an unpleasant effluvium."

Air and water must be supplied as the weather and state of the plants may determine, and the operation of impregnation should not by any means be neglected. In the application of water, it should not be done in a careless manner as a matter of course, but it should be given in a less or greater quantity as may be required, preferring to give a little and often, rather than to give a large supply at once. Accordingly as the blossoms are impregnated, and the rudiments of the young fruit appear, lay small pieces of tile or slate under each, which will prevent their liability to damp off.

Air should be less freely admitted to melons than to cucumbers, as the former require a higher temperature; however, in sunshine, the thermometer should not be allowed to rise above 75° or 80°, which is a temperature sufficiently high for their production.

In Persia, where they possess very superior sorts of melons, and where they have been cultivated from the earliest ages, great attention has been paid to their culture, growing them in fields, which are rendered capable of being frequently irrigated, and using for their principal manure large portions of pigeons' dung; indeed, so much importance do they attach to this manure, that the melon-growers keep dove-cots on purpose to procure it in abundance, and even purchase it at an extravagant price. This mode of supplying melons with additional nourishment, has of late years been recommended by many, and practised by several eminent horticulturists. Some add the pigeons' dung in their compost, while others use it diluted in water, and apply it in its liquid state, taking care that none of it falls upon the leaves. We have for several years practised both modes, but never found that the melons were of better flavor, nor more abundant in crop, than when grown in fresh virgin-loam taken from a sheep-walk, and used without any previous preparation whatsoever. Melons may probably be grown to a larger size by the application of such powerful manures; but large melons, like most other fruits of magnitude, are seldom of good flavor.

Few fruits, the pine excepted, possess higher flavor than melons, if of good sorts and well cultivated, but the larger sorts of them are seldom fit to eat; hence the disrepute into which this excellent fruit has fallen.

Those who compete for the prizes awarded for the highest-flavored melons, are very particular in this matter. They most generally grow very small sorts, principally of the scarlet-flesh rock sorts, although sometimes green-fleshed ones succeed. They seldom use any manure whatever, and are always very sparing of water; never giving more after the fruit attains its full size than what is merely sufficient to keep the plants alive, and admitting plenty of air while the fruit is ripening.

M A Y.

NURSING PINE-PLANTS.

Towards the middle of this month, the beds will have sunk considerably, and will also have declined in heat; it will therefore be necessary that the plants be all taken out, observing to tie them up as recommended in March, for the greater preservation of their leaves; which, when injured, by being broken or bruised, soon assume a sickly appearance, and cease to be useful organs of the plant. The weather may now be expected to be fine; at least, a clear day or two should be chosen for this arrangement of the young pine-plants, in order that the operation may be effected with greater safety. After they are all removed from the bed, it should be well worked over to the very bottom, and all decayed matter thrown out. Where either bark or leaves are scarce, it would amply repay the trouble to pass all those which appear exhausted through a coarse riddle, returning the rougher particles into the pit, and removing the finer or more decayed parts to the compost-yard; which, if the beds have been composed entirely of leaves, will be found an extremely useful article in the compositions which are necessary not only for the growth of pines, but also for almost every plant in the garden; and those which may not be required for entering into the composts will be a useful manure to almost any soil. Should the beds be composed of tan, or tan and leaves mixed, the composition should also be saved, as it will become useful for many purposes, both in the formation of certain composts, as well as in the covering of many roots from the severity of the frosts, and several other purposes where light mould may be required.

The necessary quantity of fresh tan or leaves should be brought in, and carefully mixed with the half-decomposed that remains in the pits; observing to keep the greater proportion of fresh matter nearest the bottom, and keeping as much of

the more decayed upon the top, in which to plunge the pots upon their being again brought into the house.

The plants will now require to be carefully examined; and such as appear in want of shifting into larger pots, should be set out, and the necessary mould and pots got ready for that purpose. In preparing the plants for potting, after their being turned out of the pots, remove all small suckers that may be forming at their roots, and also displace such small and useless leaves as are nearest to the roots, as this will induce them to push out fresh and vigorous roots from the lower part of their stem. The pots being well drained, as already directed, the plants should be placed in them, observing previously to putting them in, to examine their roots, and cut out all those which are decayed or useless, and single out those which appear matted round the outside of the ball, or at the bottom of the pot. Those which have penetrated through the holes in the bottom, and have extended themselves in the tan, should be cut off, as they must have been injured in taking out the plants; independently of which, the shortening of their roots, that are of immoderate length, will induce the plants to push out a number of others nearer to the stem. The balls should not be much broken, unless they appear hard, or the mould be exhausted; in such cases, they may be carefully pushed in pieces, and the exhausted mould removed. In repotting them, let the mould be well shaken in amongst the roots, which should be rather dry than otherwise, and finely broken with the back of the spade, or with the hands, but not sifted, unless through a very coarse riddle; for when the mould is rendered too fine by sifting, it prevents the free escape of superfluous moisture, and becomes of too close a texture for the roots to push freely in; besides, in sifting the mould too fine, all the fibrous matter that it did contain would be rejected, and consequently the best part of the compost would be lost to the plants. Let the mould be well shaken in amongst the roots, and the plant gently shaken up and down, so that no vacancy may be left amongst the roots. Those which are repotted with their balls entire, should only have a few of their outer roots loosened, and be placed carefully in a larger pot, shaking in the mould regularly all round, so as to fill up the

whole space between the ball and the sides of the pot; but, even in this case, no other means of forcing down the mould should be used except the fingers, and well shaking the pot. We do not advise the use of a stick, as is often practised, as it is very liable to injure the roots, and if used very freely, renders the mould too compact. The sizes of the pots, as has been already noticed, must depend upon the magnitude and growth of the plants; each plant should be placed in a pot of such size as is suited to its strength. Fast-growing, luxuriant plants require larger pots, while weak or sickly ones will require pots only of the same size, or nearly so, to that from which they were taken; and those which are ill-rooted and sickly, will even require smaller pots than those from which they were taken. It is much better to shift often than to over-pot at once.

In filling the pots with mould, leave it at least an inch below the level of the margin of the pots, to allow room for holding water, and when the plants are all potted, give them a gentle watering, merely to settle the mould about their roots; but do not at this time give too much water, otherwise they would be not only chilled too much while out of their usual bottom-heat, but be also liable to be shaken out of the pots. A more copious watering will be necessary when they are replaced in the beds.

Any decayed or bruised leaves should be carefully cut away, and all dead pieces at the extremity of the leaves cut off; in performing which, use a very sharp knife, hold the leaf to be so pruned by the point, and draw the knife upwards, beginning below where the leaf is decayed, and cutting upwards in a slanting direction of some length.

Replunge the plants in the same manner as formerly directed, placing them in regular order as to their heights, always keeping the smallest and those which are unpotted in front. Such as have been rooting in the bed out of pots, should now be put into pots, differing in size according to their strength, and take their place among the other potted plants. As the plunging goes on, care must be taken not to allow the tan or leaves to cover the mould in the pots too much; for, if such be the case, it will be difficult to ascertain when they may be

in want of water, or when watered too much. The tan, or leaves should be firmly packed round the pots, to keep them steady; for if this point be not attended to, the sinking and contraction of the bed would be apt to throw them into an unlevel position, by which means, the water which is given them would not be contained in the pots sufficiently long to admit of its penetrating to their roots, and the plants would also have a very unsightly appearance. They will now require more room between each other in the bed, to allow a free circulation of air and sunshine to penetrate amongst them. As the season will now be becoming milder, a frame or two may be erected in the melon-ground, in which to place all the smallest, and particularly such as are not yet potted; this will admit of plenty of room being given to the more forward plants in the nursing-pits. The operation of plunging being finished, let the whole have a good watering at their roots, and the strings of matting with which they have been tied up removed; the whole should then be well washed over-head with the syringe, to clear them of dust, and also to refresh the foliage. Place watch-sticks in the bed, at regular distances, by which the heat may be ascertained. If the season be mild, and a brisk heat come up in the bed, fires may be dispensed with, at least very much diminished, or only lighted on very cold nights, and gradually given over as the state of the weather and heat of the bed may determine. The temperature should, however, be kept up to 70°, mornings and evenings by aid of the flues, if the heat of the bed be not sufficient. Accordingly as the heat of the bed and the effects of sunshine raise the temperature, water should be more freely administered; occasionally watering with the liquid manure. Air should also be freely admitted every favorable opportunity, giving and reducing it by degrees, as the state of the weather may or may not be favorable.

SUCCESSION PINE-PLANTS.

The directions already given for the nursing-pit, are applicable also to the succession-pit. The same operations of renewing the beds, and shifting such plants as may be in want

of it, should also be performed in this compartment. The temperature, however, should be kept as steadily as possible to 65° or 70°; if after the bed be in a good state of fermentation, and the thermometer keep above 65°, fire-heat may be discontinued; but if any cold weather follow, and the temperature fall below that point, occasional fires should be used. After the fires are left off, and the flues no longer hot enough to produce steam as usual, the plants should be syringed in the evenings or mornings in fine weather, and the house shut closely up. The heat of the bed will be sufficient to produce a slight steam; or, if this be not found sufficient, the flues may be heated for the purpose of producing steam in the usual way, and afterwards the fire let out.

FRUITING PINE-PLANTS.

If the heat in the bark-bed in this compartment has considerably decreased, it may be necessary about the beginning of the month to have it renewed; but if this can be avoided, it would be more advisable, as the plants now will be more or less injured by being removed, according to the state of forwardness of the fruit. Unless the heat has fallen to too low a temperature at the roots of the plants, it would be advisable rather to refresh the heat in the bark-bed, by surfacing it over with fresh tan or leaves, that may have undergone a sufficient degree of fermentation for the purpose. This stratum of tan or leaves, may be laid on to the thickness of a foot or more, as the bed will by this time have considerably sunk; and the pots having been increased in depth by the addition of the circle of turf and mould, formerly directed to be applied, will thus stand some inches above the surface of the bed. This addition to the bed must be carefully applied, so as not to injure the plants, and will, by confining the remaining heat in the bed beneath, together with its own fermentation, produce a considerable temperature, and may be sufficient, with the addition of a little fire-heat in cloudy weather, to bring the principal part of the plants to maturity. The roots having by this time considerably extended themselves in the bed, it would be a serious check to them to be taken up, in order to

get the whole bed renewed. However, if the temperature of the bed be fallen too low, their removal will become necessary, as a want of sufficient bottom-heat at this time would be attended with serious consequences to the fruit. In performing this, therefore, the greatest possible care should be taken to remove them, so as not to injure the roots but as little as possible. The bed will not probably require to be turned over at this time quite to the bottom, therefore, in turning it over, the fresh tan or leaves used, should be kept well down, still bearing in mind to keep a sufficient quantity of half-decayed matter upon the surface, in which to plunge the pots. Such plants, the fruit of which is nearly swelled, should, as they are removed out of the bed, be supported with neat sticks, to prevent them being broken off, or the fruit-stalk damaged with their weight. During the time the plants are out, trim all decayed leaves off, and shorten such as are decayed at their points, they being of no use, and will make the plants look better when removed. Such plants, the fruit of which is fully swelled, or beginning to ripen, should not be disturbed at their surface; but all such as are less forward, should have all the mould removed from their surface that is unoccupied with roots, and either replaced now, or as soon as they are replunged in the bed.

If any of the plants appear sickly, and the fruit not more than half swelled, they may be shifted with safety, and either placed in the same sized pots, or, if their roots be few and diseased, which will generally be the case with such as show less vigour than the others, their treatment being the same, they may be placed in smaller pots, their balls being reduced, and their roots singled out, and all decayed ones removed; and if carefully repotted, and attended to with water as their state may require, they will perfect their fruit much better than if they had been left in the pots in which they formerly grew. It will, however, be a check to the growth of the fruit, and retard its ripening for some weeks. The plants being examined, and the bed ready for their reception, they should be plunged as directed in February; keeping such as are nearly ripe at one end, to be removed when cut, without deranging the whole, and their place of course filled up with

plants from the succession-house. When they are all plunged, the bed and house cleaned and regulated, give them a watering at their roots, and a profuse washing over-head with the syringe, to refresh them and clean them of the dust or filth contracted while undergoing the necessary removal. The plants showing fruit, in blossom, and swelling their fruit, should be liberally supplied with water every third or fourth day; but those which have nearly attained their full growth, and particularly such as are coloring to ripen, should have less and less water given them as they approach maturity, reducing it by degrees, until it be entirely withheld some time before ripening. If this be not attended to, the flavor of the fruit will be very much deteriorated, and lose much of that richness, which the pine is well known to possess when properly cultivated, and which has gained it the appellation of the *king of fruits*.

We may also remark, that if pines be not cut soon after they begin to color, "that is, just when the fruit is of a greenish yellow, or straw color, they fall off greatly in flavor and richness, and that sharp, luscious taste, so much admired, becomes insipid." It is often necessary to retard pines, when ripe, for some days, often a week or more after they are ripe, to answer some particular demand; and when this is the case, they should not be cut from the plant, but removed carefully in the pots to the fruit-room, or some other airy cool place, where they will remain, without much injury, for a week or more, and will not shrivel nor lose their flavor so much as when they are separated from the plant. In cutting the pine for use, if not immediately to be sent to table on the same day, a considerable piece of the fruit-stem should be left attached to it, and never, until within a few hours of the time that it is to be eaten, should those scale-like appendages upon the pips be cut off, for, in doing this, the skin might be wounded, and if kept for any time after their removal, decay would commence. Some prefer to have the pine sent to table with a portion of the fruit-stalk attached to it, and those scale-like appendages left upon it; while others have the stem cut close off, level with the base of the fruit, so that it may stand upon its own base, in an upright position. In no case, however, is the crown removed until the fruit be cut to be eaten.

Unless the weather be unusually fine, the fires must be continued till the end of this month, and probably longer. The temperature by fire-heat should be kept up to 75° as a minimum, and 80° as a maximum; however, the temperature throughout the day may be allowed to range from that to 100°, without any injury to the plants. Air must be freely admitted upon all occasions, and regulated by opening and shutting up the house, as the state of the weather may require. As the fruit approaches maturity, this is absolutely necessary to enhance its flavor.

FORCING PEACHES.

The temperature in this department should be gradually raised to 60° as the fruit advances, and the stoning of the fruit has been accomplished. After that time, all danger is over, provided the trees be in a healthy state; and the final thinning of the fruit may then be proceeded with. It should, however, be a maxim, that, however much the fruit may be thinned, it is safest to leave a few to be occasionally picked off as they advance to greater maturity.

Where fine fruit is an object, they should be thinned, upon healthy trees, to the distance of nine or ten inches apart, or even twelve; but where the trees are rather weak, not above half that number of fruit, or even less, should be left. No leaves should be picked off them at this time, as the fruit will swell much better when partially shaded with them; neither should two fruits remain upon a shoot that is not considered sufficiently strong to bring them to perfection.

Water may now be given in much more abundant supplies than hitherto, at least since the opening of the blossoms, both at the roots and over the leaves. This latter should be regularly applied every morning and evening, observing to have the morning syringing done before the sun acts too powerfully upon the house; the evening watering should be done the last thing at night, so that the water may remain the longer upon the trees. It should be applied with considerable force upon the trees, so as to annoy any insects that may attempt a settlement, as well as a substitute for wind to set the foliage in motion, which is

of much importance to them, as they are precluded from that natural agent.

The pruning and training-in of the young shoots should be continued, as directed last month, and all water-shoots and laterals removed, unless where some of the latter may be required to fill up any vacancies in the tree. Towards the end of this month, if the weather be fine, fire-heat may probably be dispensed with, but this must be determined by the range of the thermometer; neither should the fire-heat be withdrawn from them suddenly, nor all at once. Circumstances may require a slight fire in the evenings, merely to put a little heat into the house, in addition to that which it has imbibed from the sun; and even in the mornings, if dull and cloudy weather should happen, it may not be unnecessary; for, if the fruit experience a check at this stage of their growth, it will materially affect their swelling to a full size. If the borders have been mulched, or covered with dung, it should now be removed, and the application of liquid manure discontinued. The flavor of the peach is so delicate, that any food of so gross a nature would affect it. The fumigations of tobacco should be continued upon the least appearance of fly; for, if not thoroughly eradicated now, it will not be so easily effected after the fruit begins to swell off for ripening, as the flavor would be affected by the narcotic vapour.

FORCING VINES.

The temperature of the vinery should be continued at the same point recommended last month, with as much regularity as possible during the night; however, as the weather becomes warmer, the temperature may be allowed to rise a few degrees during the heat of the day, and graduated by ventilation to the proper temperature. As the fruit will now be swelling, and approaching that state when the thinning of the bunches becomes necessary, in order that the berries may have sufficient room to swell to their full size, this very necessary operation should not be neglected, as well as the tying up of the shoulders of such bunches as require it, for the same purpose.

With this view, go over every bunch in the house, and with fresh matting, or small string, fix one end of it to the extreme part or point of the shoulder of the bunch, and raise it up as high as it will admit of, without running the hazard of its being broken off, and fix the other end carefully to the wires or shoots of the vines; then, with a pair of finely-pointed scissars, rather longer than those in general use, for the convenience of getting at the berries towards the centre of the bunch, begin to cut out all the smallest first, or such as are immaturely formed, and also such a quantity of the more perfect ones, leaving the remaining berries hanging quite loose, and detached from each other. As in the case of thinning other fruits, this operation should not be completed at one time, but reserving the final thinning till the beginning of next month. It is no easy matter to say how many berries should be cut out, as that must always depend on the kinds of vines, the number of bunches upon them, and the size that the berries attain when fully matured. Those which set their fruit closely, or crowded, should be more thinned than others that set less freely; and such as have many bunches of moderate size upon them, should be much more thinned than when the crop is scanty, and, in many cases, the removal of many entire bunches will be necessary; where such is the case, the smallest will of course be cut off, and the finest left on the vine. Those which produce berries of a large size, will also require to be well thinned, and where fine fruit is the object, all must be well thinned, that they may attain greater perfection; and to say that one-fourth or one-third of the berries should be cut off, will not, in most cases, be too much. The muscadine, tokay, and sweet-water, will not require so much thinning, generally, as some of the others. These are apt to have many small imperfect berries amongst the bunches, which should all be cut out, and only a few of the perfect ones. Such compact growing sorts as the frontigniacs, should be more fully thinned, to allow room for the remaining berries to swell to their full size, as well as to prevent the chance of their rotting, in damp and cloudy weather, after they are ripe, which a free circulation of air among their berries will materially prevent.

The grapes cut off in thinning the bunches, make excellent tarts, and are used for other domestic purposes; they should, therefore, be carefully saved. If, while the operation of thinning goes on, a mat or piece of light canvas be suspended under the bunches, the berries will drop into it, and be less bruised, and more readily collected, than if permitted to fall on the floor of the house.

Water should now be abundantly applied to the plants both at their roots and also over their leaves, by means of the syringe; the use of liquid manure should now be entirely discontinued, to prevent the fruit from acquiring any disagreeable flavor; but the use of clear water will materially forward the swelling of the fruit, and give strength to the vines.

FORCING CUCUMBERS AND MELONS.

A moderate degree of heat will still be necessary to be kept up in the cucumber-beds, and air and water more liberally supplied than has hitherto been done. The crops of early cucumbers will now be bearing in abundance, and will require little further attention than the admission of air and a plentiful supply of water. When the vines or shoots become confused or crowded, let them be moderately thinned, so as to admit a circulation of air into every part of the bed; this thinning should be performed by degrees, and not at one specific time; for which purpose, look over the beds once or twice a week during the season. When the plants appear affected by the too powerful influence of the sun, let them be shaded during a few hours each day, as directed last month, either by spreading a thin mat over them, or a little hay, straw, or dry litter; which, however, should not be put on too thick, nor yet allowed to remain on too long in the afternoon.

Ridges may now be put up, on which to plant out cucumbers, to produce their fruit under hand or bell-glasses, if not done last month; but it may be necessary, for the greater supply, to put some out on ridges both at that and the present time also. For directions on this head, see *last month.*

The melons which were sown in January and February, will now be in perfection, or nearly approaching to it. As these fruits approach maturity, let a smaller quantity of water be given, and air freely admitted; for, without these points be attended to, the flavor of the fruit will be indifferent. They will now require no more water, but merely sufficient to keep the plants in life, until they ripen off their fruit. The vines may now be thinned out considerably, but not until the whole of the fruit be just on the eve of ripening; for if done sooner, it would give too sudden a check to the plants, and cause many, probably the whole of the fruit, to ripen prematurely, and become shrivelled and insipid. This thinning of the vines is only intended to admit of a free circulation of air, and to allow the sun to penetrate to the fruit without being shaded by the foliage.

A watchful eye should now be kept upon the fruit, so that it may not be permitted to remain upon the plant longer than it is ripe, for if this be allowed, the fruit will lose much of its flavor. It is only by observation that the gardener can become acquainted with the proper time to gather the fruits of his labour, and this observation is strikingly applicable to melons: no specific time can be fixed on, with any certainty, when to cut this fruit, ripening, as it does sometimes, in the interval of a few hours. Those which, to all appearance in the morning, would have required a day or two to ripen, may, towards the afternoon of the same day, be in a fit state to send to the table. Some sorts change color previously to becoming ripe, whilst others retain their original color after they are ripe. A disposition is generally to be observed of their breaking away from the foot-stalk of the fruit previously to their being ripe: this point should be attended to; and as soon as that part which joins the foot-stalk and the fruit becomes cracked all round, the fruit may be cut with safety. Some sorts indicate by their perfume that they are ripe, whilst others, and indeed some of the finest, have little or no smell until they be cut open. They should be sent to table as soon after they are cut as possible, as they lose much of their flavor by keeping. This is, however, not always prac-

ticable; for when it is intended to keep them for a few days after they are ripe, they should be placed in a cool airy cellar, or fruit-room, and during the time that they are there, they should be placed upon clean sheets of white paper.

The saving of melon-seeds is an important part of the duty of the cultivator, as much future disappointment will occur, should the seeds of different sorts be mixed or substituted for each other. The individual who is particular in the flavor of his melons, will act judiciously, when he cuts a fruit to his mind, to save the seeds. It is from fruit of the earliest crops that seeds should be saved, as by that means there is less chance of the sort being impregnated by any other of less merit; as in the early part of the season, the operation of impregnation is necessary to be done by the cultivator, and that operation being performed from flowers in the same frame, and possibly from the same plant, there is less risk of the seeds becoming hebridized at that time than at a later period of the year, when bees and other insects are flying from flower to flower, and carrying the fertilizing dust of the male flower to the female. As the seeds are selected from one or more fruit, but which, for greater certainty, should be kept separate, they should be carefully washed in clean water, allowing those seeds which swim upon the surface of the water to float off, reserving such only as sink to the bottom. These, when sufficiently dry, should be packed up in papers, the seeds of each fruit put up separately, correctly labeled, their name, size, quality, when sown, when cut, and any other observation of interest written upon the packet, together with the year of their growth. Melon-seeds improve by age, and should not be sown, if it can be avoided, under two years old. They will retain their vegetating properties for twenty years or more. If seeds of the growth of last season be sown, they for the most part produce plants of very gross habits, and will not be so fruitful, but grow more to vines than fruit.

To obviate this disadvantage, when older seeds cannot be procured, the seeds may be worn in the pocket, near the body, for some weeks previously to sowing, which will have the effect of fully maturing them.

Some gardeners place much dependance upon the second and often upon a third crop from the same plants, but this is not to be depended upon. The finer kinds of melons will seldom produce more than one good crop of fruit; for to have the fruit in perfection, the vines are generally killed, or so much weakened by the sparing supply of water given them during the ripening off of the fruit, that they seldom break sufficiently strong to produce a second, much less a third crop.

Young plants may be brought forward in the secondary frames, and when too large to remain uninjured in the pots into which they were originally potted off, they may be transplanted into small baskets, in which they may remain until the crops be removed from under the frames hitherto occupied with the earliest crops; and when those are cut, the beds may be renewed, fresh mould put in, and the plants removed into them, still in the baskets, which may be partially cut away, or may remain, as the roots will find sufficient means of escaping into the fresh mould of the bed. A little gentle heat applied, and sufficient air and water administered, will forward these plants into fruit in due time. Such plants will produce better fruit, and with greater certainty, than by pruning in and regenerating the old plants from which the crop has been cut.

Some of the early canteloupe varieties will, however, produce second, and often third crops, by being sufficiently cut in after their first crop has been cut; but these, although extremely well suited, owing to their hardiness and free setting, for the most forward crops, are not to be put in comparison with many more preferable sorts; which, if treated as above, will produce their fruit in August and September, and although less in number or quantity, will be decidedly superior in flavor.

Those, however, who prefer to re-establish the old plants for future crops, should shorten in the vines or shoots to a good fresh-looking eye, and thin out all decayed or unhealthy shoots, dead leaves, &c. In cutting, attend to cut an inch or two above the joint from which the fresh shoots are expected to issue, and bruise the end of the shoots so cut between the

finger and thumb, which will in a great measure prevent their bleeding.

The plants so treated should be shaded from the mid-day's sun for a few days, exposing them by degrees. Let the mould in the frames be well watered and fresh surfaced with fresh mould. Previously to laying on this additional fresh mould, fork up the surface carefully with a bit of stick, but not so as to injure the roots. For some time after this operation, the frames should be kept shut up rather close, which will induce the plants to push out fresh roots; and as they appear to be rooting, and breaking into fresh shoots, let air be again admitted gradually until they be fully re-established. After this, give air, water, prune and train them, and otherwise manage them, as if they were young plants. After this second crop is cut, proceed in like manner to prepare for a third.

The successional crops of melons should be attended to, as directed above for the early crops; and if attention be paid to these hints, or improved upon, the success will be complete.

Ridges should now be put up for planting out melons, to produce their fruit under bell or hand-glasses. These ridges should be put up as already directed for cucumbers.—(See *last month.*) Or beds may be put up similar to those for the production of the earlier crops, and covered with frames and sashes fitted with oil-paper instead of glass. The plants for this purpose being raised from seeds sown in March, or the beginning of last month, will be now of a proper size for final transplantation into frames of the above description. The general management of melon-plants in such frames, is the same as of those under glass, as has been already described.

Plants now put out under such frames or upon ridges covered with hand-glass, will produce their fruit by the end of July, and in August and the beginning of September they will be in perfection. Beds are sometimes made up for the production of these fruits in the form of an inclined plane, presenting their sloping side to the sun; and such beds appear to have been the most primitive form, both for the production of cucumbers and melons, and are reported to have been in use, amongst the commercial and private gardeners, so early as Charles the Second's reign, and were covered with straw

as a protection from frost at night. Beds of a similar nature have been recommended by a writer in the *Hort. Trans.*, but it is only in very favorable situations that these fruits can be produced in any perfection upon such beds, without the assistance of glass.

The market-gardeners in the vicinity of London, produce great crops of melons upon ridges similar to those already described for cucumbers, making the ridges parallel to each other, and as their heat declines, they fill up the spaces between them with fresh dung, which adds fresh heat to the plants, while it completes the beds for the plants to run upon.

The distance at which the plants are placed from each other, that is, the patches, or holes of three plants each, is about four feet or four and a half feet. When the plants are planted, give a little water to settle the mould round their roots, and put on the glasses over them, which should remain close down for a day or two, if the bed be not very warm. As soon as the plants have struck root, the glasses may be elevated a little by degrees, so as to admit of a sufficient quantity of air for their support; this air to be gradually augmented until they be finally established, and then the glasses may be removed during fine days, but replaced every evening. It will be necessary to cover them also at nights with mats, for fear of frost, which not unfrequently happens during this month, and which, if the plants be not protected from it, would entirely destroy them. For a few days after the plants are put out, shade them from the full sun a few hours every day; and as they get established, let such shading be discontinued by degrees, thus accustoming them to the full power of the sun. When the plants have covered the space under the glasses, they should be allowed to escape out under them, but it will not be before the end of the month that they can be considered as safe from slight frosts. Those shoots which extend beyond the limits of the glasses, must be carefully protected from cold or injury, by covering not only at night, but also during the coldest part of some days, but this covering must be determined by the state of the temperature of the weather. As they extend beyond the limits of the glasses, their shoots are to be regulated and pegged down to the

surface of the bed, as already directed for melons under frames and glasses. As the weather becomes more mild, elevate the glasses upon bricks or other props, sufficiently high to admit of the runners spreading freely out on all sides. For the better protection of the plants, as they extend from under the glasses, it will be advisable to have in readiness a sufficient number of oil-paper frames wherewith to cover them, previously to removing the glasses altogether.—(See *next month.*)

Cucumbers, to pickle, are often sown in the natural ground where they are to remain, and in favorable situations are found to succeed perfectly, but for this purpose, it will be soon enough towards the end of this month to sow the seeds. Where the situation is favorable, and the demand great for such crops, a piece of ground is put in readiness for the reception of the seeds by being dug regularly over, and manured, of a size according to the quantity wanted; it is then divided into beds five or six feet broad, allowing a foot or eighteen inches for a footpath between each bed. The seeds are then sown in patches along the middle of each of the beds, each patch being about three feet and a half apart; in each patch ten or twelve seeds are dropped, and covered to the depth of an inch.

If the weather should prove dry and hot, give moderate supplies of water to each patch of seeds; but this must be rather sparingly administered, for, if too freely indulged in, great danger would be incurred of rotting the seeds altogether. When the seeds have germinated, and the young plants are coming up, water may then be more freely given to them.

When the plants have been up eight or ten days, they should be carefully thinned; for if each seed sown has germinated, the plants will be much too thick. This thinning should not be done at once, but at two or three several times, allowing a day or two to intervene between each thinning. If the weather be cloudy, or if warm showers have fallen, take advantage of such weather for this operation; but if no warm showers should fall, give a gentle watering both before thinning and likewise afterwards, which will prevent any of the plants which are intended to remain from sustaining injury. When finally thinned, they should stand in number

three or four only of the best and strongest plants in each patch.

This is the method adopted by the London gardeners, and those who supply the metropolis with this fruit; but, in the majority of situations, the most certain method of procuring them will be found to put up slight ridges or hot-beds for the reception of the plants, which beds need not be more than eighteen inches or a foot in height, according to the quality of the material of which they are composed, and of a length sufficient for the quantity intended to be grown. Their breadth need not be more than three feet, and placed in ranges parallel to each other, for the greater facility of covering them up and otherwise attending to them, as well as for the more readily filling up the spaces between them with fresh dung, sweepings of lawns, weeds, or other vegetable matter capable of affording an additional degree of heat, should the season turn out cold and backward. These beds or ridges should be entirely covered over with light rich mould, not sifted, but well broken with the spade, to the depth of ten or twelve inches. The beds being thus prepared, remove the plants into them, presuming that they have been previously reared in pans, and potted off in small pots, three or four plants in each, and forwarded either in some of the hot-beds occupied with melons or cucumbers, or, if wanted in a considerable quantity, upon a bed or beds purposely put up for them. They should be planted out, exactly as directed last month for cucumbers, upon ridges, and their general management attended to in a similar manner; covering them with hand or bell-glasses, or oil-paper frames, as a protection from the cold and wet; or they may be sown at once upon the beds or ridges, prepared as above for them, but the heat of the dung will, in this case, be considerably exhausted before the plants attain any considerable size. It is, therefore, much better to raise them previously, and transplant them when of a proper size, by which means they will be fully established before the first heat in the ridge or bed declines.

JUNE.

NURSERY AND SUCCESSION PINE-PLANTS.

During this month the young pine-plants will require liberal supplies of water and air, all of which will promote the growth of the plants. It may, however, be necessary to shift some of the plants into larger pots, that is, such as may have been marked out at the last shifting, and which were not then immediately in want of that assistance; as also to pot any of the crowns or suckers that may now be sufficiently rooted either in the front of the nursing-pit or in the frames, where the young plants of that description may have been placed, both to enjoy the advantage of light and room, and to afford the same advantage to such as are more forward in growth in the nursing or succession-pits. These frames should be kept up, by means of linings and renewing the beds occasionally, to the same temperature as recommended for the nursing-pit; and their general management must also be the same, only such of them as may have been planted out into decomposed leaves or rotten tan, will not require so much water, and it is essentially necessary to guard against too much rank steam, which would here produce a disposition in them to rot at the heart. Watch-sticks should be placed in the frames, and often examined, particularly after renewing the beds or applying fresh linings, as the roots, not being in pots, will be more liable to be injured by too much bottom heat. As the plants in these frames become sufficiently rooted, let them be potted in small pots, according to their size, and plunged again; they will then be in fit order in autumn to take their places in the nursing-pits, when such as are there at this time will have been removed to the succession ones.

FRUITING PINE-PLANTS.

The directions given last month for the general management of the fruiting plants, should be closely followed up during this month; observing to withdraw the quantity of water gradually from the plants as the fruit approaches towards perfection. Air must be freely admitted, and, if the weather be now fine, fires may be gradually discontinued, provided the temperature can be kept sufficiently high without them. As the fruit is cut for use, the plants may remain during the greater part of this month undisturbed, to forward the growth of the suckers: some of these will be sufficiently fit for being taken off the old plants before the rest; and such as are found to separate freely from the old plants, and have become of a brownish color at their bottom, may be taken carefully off, which will enable the plants to bring the remainder to greater perfection. Accordingly as these suckers are gathered off the plants, and the crowns returned after the fruit has been used, they should be laid by for some days to dry and harden at their bottoms. The crowns will generally require to lie longer drying than the suckers; a few days may be sufficient for the greater part of the latter, when they should be planted into the frames or in the front of the nursing-pit to root. After the crowns are fully dry, so as to be not likely to damp, a few of the lower and smaller leaves should be removed, and then planted along with the suckers to root, where they must remain till August, when they must be potted according to their respective sizes. Such plants as have had their fruit cut and their young suckers taken off, should be removed, and thrown away as fit for no other use. This will afford more space to those which remain, and make room for any that may have either been kept in the succession-pit for want of room in the fruiting-pit, or for such as may either have started prematurely, or been started for the purpose of fruiting late in autumn. Where there are any of these, they should be brought into the fruiting-house, accordingly as room is made by the removal of those which are taken away, and plunged here until a general regulation take place in the next

month, or beginning of August, as the state of the crop may determine. Such plants as are coming in for successional crops to ripen in autumn, and any that may have remained without showing fruit in the fruiting-pit, should be supplied with water, and otherwise managed, as has been already directed for such plants in the former months.

FORCING PEACHES.

The fruit will now be approaching fast to maturity, if the directions given in the preceding months have been fully acted upon, and other circumstances equally favorable have occurred. Air should be admitted now in large portions every day, and when the fruit is ripening, the sashes (if moveable) should be drawn down every fine dry day, that the fruit may enjoy as much as possible of the influence of the sun and air, to improve its flavor and color. It is a well-known fact, that peaches ripened in houses are never so fine-flavored, nor yet so well-colored, as those upon the open walls; therefore, the more they are now exposed to the free action of the sun and air, the finer will the fruit be. Care must be taken that, upon the approach of rain, the house be covered up, as wet would be highly injurious to them at this time. The waterings must now be discontinued; beginning first by withholding the bottom watering, and by degrees the use of the syringe, until the whole be left off. The leaves which shade the fruit, and which were directed last month to be left on, should now be displaced. If they cannot be pushed aside sufficiently to present the full exposure to the sun, let them be entirely taken off, leaving about an inch of the lower part of the leaf, together with the foot-stalk of the leaf, which may, in some cases, mature the bud at its base. To have high-colored and fine-flavored fruit is the ambition of every gardener; no means, therefore, are so likely to produce those effects as the removal of the sashes from the roof of the house at this period; but, as it has been already observed, care must be taken that they be shut up again upon the approach of rain.

When the fruit is ripe and beginning to drop, nets should be suspended under the trees for the fruit which falls to drop

into; but it should always be borne in mind, that such fruit which is allowed to remain on the trees till it fall of its own accord, is much injured in its flavor, therefore it should be gathered by the hand when ripe, or rather before it becomes too ripe. Many ridiculous inventions have been puffed up under the name of peach-gatherers, but the safest and best is the hand; the sense of feeling is sufficiently acute in most people who have the gathering of such delicate fruits, as to be able to tell, by a very slight touch, when the fruit is fit or not fit for pulling.

When gathered from the tree it should be carried to the fruit-room, and carefully placed upon clean paper, if not immediately wanted for use. Peaches may be beautifully colored or spotted, by sprinkling drops of water upon them when the sun is shining fully upon them.

FORCING GRAPES.

The crop will now be fast approaching to perfection; but as, after the fruit begins to color, water should be withheld, it is necessary, as was hinted at for the peach-house, that a careful examination should be made to detect the appearance of the red spider, which, if any should appear, and not entirely banished at this time, will not be so readily expelled afterwards, as the process of watering must be withheld, so as not to diminish the flavor of the fruit. If any of this arch enemy be detected upon the leaves of the vines, they should be well syringed from both ends of the house, that no leaf may escape the action of the water; and any leaves much infested, should be removed, so as to prevent, as much as possible, the spreading of the enemy through the house. The house should also have a slight fumigation of tobacco-smoke, for the annoyance of the green fly and thrips, should any of these appear; but should they not make their appearance, it is still necessary to fumigate, for prevention. On the appearance of the spider after the watering has been discontinued, flour of sulphur may be successfully sprinkled upon the flues when considerably heated, or it may be sprinkled upon the affected leaves.

The vines should be examined, and all those unnecessary shoots, which have been already noticed as useless, removed by the means and in the manner before directed, so that no expenditure of the strength of the vines may be permitted, which will now be wanted for the nourishment of the wood and fruit. Those shoots which are retained for bearing next year, should be neatly and carefully tied into the trellis as they advance. All superfluous laterals, tendrils, and decayed leaves, should be removed, as causing confusion, and robbing the vines of a considerable portion of their strength.

The fruit should, as it becomes colored, be exposed as much as possible to the light and sunshine; but this is not to be done carelessly by sacrificing too many of the leaves, which is often done to the injury of the fruit. A few of such leaves as are overshadowing the fruit, if they cannot be put aside, should be cut off, leaving the whole length of the foot-stalk of the leaf remaining. The grapes will swell much better in a partial shade than when fully exposed to the sun; their color, however, will not be so high, neither will their flavor be so good as if they were more exposed.

Water should now be withheld from the roots; the syringing should also be discontinued by degrees, and entirely left off when the fruit begins to color, otherwise the fine bloom which enhances the appearance of the fruit will be destroyed, and the flavor will be less saccharine. The state of the weather will now probably admit of the fires being also discontinued, but this must be always determined by the indication of the thermometer. In wet, cloudy, or damp weather, slight fires may be necessary to prevent any decay among the fruit from damp; all berries, as they appear in a decaying state, should be instantly removed, and many of them, from the unavoidable wounds they may have received from the sharp points of the thinning scissars, will show symptoms of rottenness; these should be all removed before they infect their neighbours. If the weather continue damy after the fruit is ripe, they should be looked over frequently, to prevent all disposition to decay; if this be not attended to, many of the largest and finest bunches will be spoiled.

In gathering the crop, it is most usually done as it may be wanted; the vine possessing this important advantage over most other fruit-bearing trees, that the fruit will remain a longer time after being ripe upon the trees without being injured; and some kinds of grapes are materially improved by remaining upon the vines until they begin to shrivel. A free circulation of air, and every means used to prevent any humidity in the house, are conducive to this effect; and when the bunches are cut for use, they should be examined as to their ripeness, for sometimes those bunches which appear the highest colored, and in other respects to be ripe, are really not so ripe as others, which, from appearance only, would be supposed to be less so. The cultivator, in this case, has a sure criterion to go by, as he can taste the fruit, and readily judge, by the flavor of one or two, of the state of the whole bunch. Those berries which are nearest the bottom of the bunch are generally the longest in ripening, these, therefore, should be chosen for the test; and if they be found to possess sufficient flavor, the whole bunch may then be concluded to be ripe. When the bunches are cut, it should be as close to the shoot from which they issued as possible, that is, within an inch or so, leaving as great a length of fruit-stalk to the bunch as can be obtained. They should then be put into a flat fruit-basket, in which is placed a piece of fine paper, to prevent the bloom from being destroyed; and when it is necessary to move the bunch, it should be done by taking hold of it by the foot-stalk, and not by handling the berries. Any of the stalks that supported the berries, which may have been taken off for tasting, or which may have been removed in consequence of becoming decayed, should be neatly cut out with a pair of fine-pointed scissars, so as to give the bunch as entire an appearance as possible.

During the time from the berries first becoming colored till the crop be all cut, as much air as possible should be admitted into the house, in order to improve the flavor of the fruit and assist its coloring. For this purpose, the sashes should be drawn down to a considerable degree every fine day, but immediately drawn up again on the appearance of rain.

In proportion as the fruit attains maturity, many of the leaves, from various causes, will appear lifeless; their office being completed, they may be removed, for the purpose of admitting as much light and sun to the remaining crop as possible, as well as to ripen the wood for that of the succeeding crops.

They should not, however, be removed until they be of no longer use to the plants. Their removal will also clear the house of any remaining spiders, or other insects, that may have made their appearance since the watering has been desisted in.

CUCUMBERS AND MELONS.

The cucumbers in frames will still require attention. Water and air should now be freely supplied to them in larger portions than hitherto. They will now require to be watered every or every alternate afternoon at least. Several persons only water once or twice a week; but it is much better to give this very necessary element often, and in less quantities at a time. They should be freely watered over-head with a moderately coarse rose watering-pot, so as to wash off the dust from their leaves, which to all plants is always extremely injurious, as the dust falling upon their leaves stops the pores through which they are supposed to breathe, and which must, consequently, be highly detrimental to them. Independently of which, there is something so congenial to the growth of cucumbers in a humid atmosphere, that frequent sprinkling with water is necessary to their welfare.

The plants should now have air freely given to them, by tilting up or drawing down the sashes according to the state of the weather. Unless it be cold, and very wet and cloudy, the linings need not be kept up so strong as hitherto; still it would be advisable to keep up a moderate temperature for the welfare of the plants. Towards the end of the month, the plants, if in frames, may be allowed to extend their shoots from under them, by having the frames lifted up, and supported upon bricks or other props at their corners. The linings should, in that case, be earthed over, for the vines or shoots to run upon; for, by this means, the plants will extend

themselves to cover a greater surface, and consequently produce a greater quantity of fruit. However, if the weather be not very favorable, this operation may be deferred till the beginning or middle of the following month. Those cucumber-plants which were last month planted out on ridges, and covered with bell or hand-glasses, may now be suffered to extend freely from under them, protecting them at nights, as already directed last month, with mats, or other coverings. For this purpose, the glasses should be propped up, for the more ready admission of the extension of the shoots.

These plants will require frequent supplies of water, but not so frequent as those which are confined in the narrow limits of a pit or frame. It is better that they be kept rather dry than otherwise, particularly until the end of the month.

The cucumber-plants sown last month in the natural ground to produce picklers, should be thinned, when the rough leaf begins to advance in the heart of the plants, to the distance noticed last month. From this time, let them be kept clear of weeds, which can be easily done by carefully hoeing them; and this practice will not only make the ground look neat, but will materially promote the growth of the plants. As the plants advance, let a little fresh mould be applied round their roots and stems, which will greatly strengthen and support them. They should be refreshed with water every day, if dry weather, but this must not be given in too large a quantity at once.

Cucumber-seeds may still be sown, if not done last month, for a full crop of picklers; for directions on this subject, see *last month*. The plants now sown will come into bearing by the middle or end of August, and will continue generally until destroyed by the autumnal frosts.

It was intimated last month, that it would be advisable, in order to forward a crop of these plants, to have such a number, as may be wanted, raised upon a bed or beds, to be finally transplanted where they are to remain, to perfect their crop. At this time, such plants so forwarded will be in a fit state to be transplanted where they are to remain, and should be now attended to. (For directions for planting out, &c., see *last month*.)

The successional crops of melons in pits or frames, will still require attention; care must also be taken that they be shaded from the sun, when they show any symptom of flagging or drooping their leaves. This should be particularly attended to, where the plants do not stand the sun well, but shrink or flag their leaves considerably, or where they are situated too near the glass, as the full noon-sun would be apt to scorch their leaves, and in some degree shrink or exhaust the juices of the plants, whereby the advancing fruit would be checked, assume irregular shapes, and become stinted in its growth.

This disposition to flag proceeds from a variety of causes; the principal of which is, when the mould in which they are planted is too light for them, or where the dung in the beds has sunk unequally, and thereby caused the mould to crack in various directions, and by that means tear and destroy the roots. It also often happens when there has been a long continuance of dull cloudy weather, succeeded by powerful sunshine. From whatever cause this appearance is derived, it is of so much consequence to the future welfare of the plants, that means must be used to counteract its effects. This is to be remedied simply by shading them, by covering the sashes with a thin mat, or sprinkling dry litter, hay, or straw, over them, during the time the sun is most powerful. But this shading must not be carried to an extreme, for the plants should be gradually accustomed to sunshine, until at last they are enabled to stand it without injury.

The plants should now have a large share of air admitted to them by propping up the sashes, or pulling them down, and drawing them up alternately.

Water must be frequently administered to them, but not in large quantities at a time, preferring to give it frequently, say every, or every other afternoon, as soon as the sun is sufficiently off the frames to prevent scorching. The extreme parts of the beds will require the most water, not only because the major parts of the roots are supposed to be extended round the sides of the bed, but also because those parts are more liable to be dried up by the heat of the linings while they are applied, and by the action of air upon the sides of the beds when the linings are discontinued.

It is not proper to give much water near the main-stem, either of melons or cucumbers; and as the fruit of the former attains its full size, water should be gradually withheld, giving only a sufficiency to keep the plants alive. If the beds have been moulded up to a proper depth, slight waterings will at all times be sufficient for melons, but not by any means to that extent, which is given to cucumbers. While the plants are setting their fruit, water should be sparingly given; and when any tendency to damp or mouldiness appears, it should also be withheld, and all dead or decayed leaves or shoots removed. Too much humidity would prevent the setting of the fruit, and make them turn yellow and damp off; but when a sufficient number are set, and beginning to swell, water may be more freely given, never, however, too abundantly, as too much moisture proves hurtful to the roots and stems of these plants, and causes them to rot and decay. Continue still to cover with mats every night till towards the end of the month, when the covering may be dispensed with.

If melons were planted out last month under hand or bell-glasses, they should now have full liberty to extend their shoots from under them, as already directed for cucumbers; for this purpose, if the glasses be raised only two or three inches, it will afford sufficient room for the branches or shoots to escape. As yet, little water will be required by these plants; too much of it would tend to rot or chill the roots, and thereby prevent the setting and even first swelling of the fruit. When the weather is naturally wet, water from the pots may be dispensed with, and care taken that the plants be protected from too much of it, either by means of canvas, supported upon hoop arches placed across the beds, or by covering with Dutch reed-mats, which will carry the water off sufficiently. The glasses should be kept constantly over them, and air admitted by propping up the glasses by wedge-shaped pieces of wood, or other similar contrivances.

Frames covered with lights fitted with oiled-paper instead of glass, are extremely useful in the cultivation of melons at this season, when more of that fruit is required than can be conveniently grown under glass; and by such means, the cultivators for the markets are enabled to grow a great quantity

at much less expense, than by using lights of glass entirely. Such frames may be made exactly similar to those, which are made to be covered with glass sashes, or they may be made of inch-and-half boards, extending the whole length of the bed or ridge without any divisions, and the back and front connected by rafters, on which to support the sashes. Such frames, if taken care of, will last for many years, and the lights may be used for protecting the blossoms of peaches, nectarines, &c. in spring, as hinted at in the *Fruit Garden.*

Some gardeners use these frames from the beginning, but the proper time for having recourse to them is when the plants have been forwarded under hand or bell-glasses, till their runners require training out beyond the limits of the glasses, which is generally the case sometime in the course of this month. These paper screens should entirely cover the bed and plants, over which they are to remain during the rest of the season; they will afford protection from heavy rains or tempests, as well as from nocturnal cold, and also screen the plants from the excessive heat of the sun, as being pellucid, they effectually admit the influence of light and warmth.

Where the ridges for melons have been made parallel to each other, the spaces between them should be filled up with leaves, dung, or the refuse of the garden, such as leaves of cabbages, weeds, and other fermentable matter; this will give additional heat to the beds, and when filled up, increase the space on which to train the plants. The general management of them now differs in few respects from that of those in pits or frames. (For earthing up, setting, training, and pruning, see the *preceding month.*)

Melons are subject to be infected and injured by the mildew, and also by the canker. These diseases here, as in all other cases, proceed from bad management; that is, the climate is bad in which they live. There may be an insufficiency of heat, and the dung and mould are then too moist, by which a stagnated heat is produced; or it may arise from damp, occasioned by over-watering or imperfect sashes, and not unusually from injuries sustained in their branches, by being bruised or too much cut at once. Nothing will prevent plants from the attacks of insects or disease but heat, sweet air, and

a sufficiency of water, which greatly tends to sweeten the atmosphere, and makes it congenial to vegetables as well as to animals. Nothing will eradicate disease from melon-plants but plenty of heat, and a due portion of water sprinkled all over their leaves, and air given in a quantity sufficient to keep the atmosphere of the beds pure, and also in a state of change. Plants much diseased, or much infested with insects, never can produce good fruit. The mildew generally makes its appearance upon the old leaves of the plants of melons, and also on the extremities of the young shoots, and is caused by their not having healthy nourishment comprehended in the elements in which they grow, or that those elements do not harmonize in the proportion of the growth of the plants. It is observed by cultivators, that when a bed gets into a stagnated sour state, the plants cease to prosper, the air in the frames becomes saturated with unhealthy particles, and so also must the juices be, which are imbibed by the plants by their roots or leaves. These, consequently, breed diseases, if means be not used to prevent them.

Melon-plants at all times, particularly when approaching to maturity, are subject to the attack of that minute and destructive enemy, the red spider. Whenever the temperature is high, and water withheld for any length of time, it is almost sure to make its appearance. Upon most plants it is easily got rid of, by simply attending to use the garden engine or syringe freely, and with considerable force upon the parts infected; but upon melons it is not so easily subdued, as those means can seldom be applied, considering that too much moisture applied would injure the plants, and the necessary force required to dislodge it, would be more than the tender frame of those plants could bear with safety. The following remedy has been recommended by M'Phail, and we have always found it effectual in practice: "Get plenty of horse-dung, thrown up into a large heap; turn it over once or twice, shaking and mixing it well, and let it lie till its rankness be somewhat evaporated; if if there be linings at the beds, take them entirely away, examine the dung in the beds, and if it be wet and have a bad smell, take a sharp-pointed stake, and make holes all round in the sides of the beds, into their centre, in such a slanting

way, that the water may easily run out of them; then make a strong lining of the prepared dung all round the beds, and, by occasional augmentations, keep up the linings nearly to a level with the surface of the earth in which the plants grow. As soon as the linings have cast a strong heat into the beds, scatter some flour of sulphur all over the plants, and keep as strong a heat in the frames as the plants can bear. A heat of 120° will not destroy them, if the steam of the linings be prevented from getting in among the plants. Water the plants all over their leaves about once a week with clear water, 100° warm; and if the sun shine, keep the lights shut closely down all day, and cover them up in the evening, leaving a little air at each light all night, to prevent a stagnation of air amongst the plants. Continue this process till the mildew and insects disappear and the plants appear to grow freely, and afterwards manage them in the usual way, taking care to keep up a good heat in the linings. This method sets the old stagnated bed into a fermentation, which makes the moisture run out of it, and dries it, so that water given to the plants has free liberty to pass off. If the linings do not heat the air in the frame sufficiently, let some of the earth in the inside, all round the sides of the frame be removed, to let the heat of the linings rise freely into the frame. If the plants be kept in a healthy free-growing state, few insects and diseases will attack them; but if they be allowed to experience a check, from want of sufficient heat, a too liberal supply of water, or such like, then insects and diseases quickly follow."

JULY.

PINE-PLANTS.

The directions given last month, as well as those in the preceding one being fully attended to, nothing requires to be said upon this subject till the beginning of August, unless it should so happen that the general crop of pines are cut, and many other plants being in the succession or other pits are in a state of forwardness, and intended to be fruited in autumn; then the directions to be laid down next month for the general arrangement of the house, will be applicable to this month, and may be proceeded with accordingly.

PEACHES.

The crop of fruit having been gathered, and the sashes removed during the day, for the immediate purpose of improving the flavor of the fruit, the trees will have been sufficiently accustomed to the rays of the sun to admit of the lights being wholly removed this month, with the view of being employed to accelerate the ripening of late peaches or vines upon the flued walls; or, if not wanted for that purpose, to be removed to the back sheds, to remain there till again wanted. After the fruit has been gathered, the peach-trees should have a hearty watering, both at their roots and also over their heads, with the garden-engine or syringe, applying the water with force for the suppression of the red spider, and also for refreshing the trees; which, during the time of the ripening of their fruit, will have had no water given them.

As the leaves ripen, they should be gently brushed off, to admit the air and sun to the branches, in order that they may be sufficiently matured for next year's forcing. Many of the shoots will spring into a second growth, if supplied too bountifully with water after the house is thrown open; but this watering need not be given in such abundance. Those shoots

which spring are generally only such as are luxuriant, or not fully matured, the consequence of which is of very trifling amount.

The directions given for the treatment of the peach-house, in the preceding months, are to be applied to those peach-houses which are coming in, in succession, making a poper allowance for the season.

VINERY.

The crop will now be ripe, and probably all cut, if not retarded or saved for particular purposes; if such be the case, attention must be paid to keep up a free circulation of air, and to remove all appearance of decay in the bunches, by taking off all decayed berries, and keeping the interior of the house as dry as possible, unless the vines show evident signs of a want of water, which is not often the case, if they have been managed according to the foregoing directions, and the borders have been previously well formed. In damp or cloudy days, it may be necessary even now to light slight fires, for the purpose of drying up the moisture in the house; but this should be done during the day, and air given at the top of the house, to give the steam, which may evaporate more or less from the borders, free means of escape, as well as to keep the thermometer from being materially affected. A cool dry atmosphere is what is wanted for their preservation, and all means likely to promote that end should be resorted to. Coal-ashes, decayed granite, or trap, the two latter of which have been found by Professor Leslie to be powerful absorbents of moisture, may be scattered on the floors and flues of the vinery, or any other absorbent matters which circumstances or situation may offer. Coal-ashes are most generally used, as being within the reach of every one, who has hot-houses heated by coal fires.

At this season, the fruit will remain for several weeks (particularly some of the thicker skinned kinds) upon the vines, without injuring either the trees or the fruit; or, if required to be kept for any greater length of time than may be found convenient in this way, the bunches may be cut and suspended

from rods or strings in any cool airy chamber or fruit-room; but where there is the convenience of an ice-house, or ice-cold chamber, these places will be much preferable, taking care in all cases to remove such berries as begin to decay, before they contaminate the rest.

The fruit being all gathered, those shoots which produced fruit this season and are not really wanted for the purpose of producing similar shoots for a succeeding crop, should be pruned off, to give more room for those which remain, and also for such strong shoots as may have been retained for the like purpose; and any of these latter, which from want of sufficient room, or other reasons, may have warranted their being suspended below the rest of the vines, should be taken up and tied in close with the other, so that they may enjoy all the benefits of the sun and air to facilitate their maturation.

The border should also be now watered, to such an extent that the water may freely penetrate to the lowest roots, but this watering should not be effected at one time; beginning gradually, and continuing until the border be sufficiently moistened. This moisture is necessary to be continued until the leaves begin to drop, when it may be entirely dispensed with. The engine or syringe should also now be applied with sufficient force to dislodge such insects as may have made their appearance during the suspension of watering. The weather being now more favorable to their propagation, they will at this time be in myriads on almost every tree, particularly such as may be termed *asperifolius*, or having their leaves bisect, with strong harsh hairs, such as the *ulmus*, *rosa*, and many others.

The house should be now kept as open as possible night and day, that the leaves of the vines may be gradually accustomed to stand the full force of the sun without the intervention of glass, preparatory to the lights being entirely removed, either for the purpose of being applied to ripen late grapes or peaches upon the open or flued walls, or for being removed to the sheds until again wanted the ensuing season; or they may be drawn down to their full extent, and left so: but this latter practice will not look so well, and the glass will be liable to be broken and the sashes injured.

Many excellent cultivators never uncover their houses, and indeed the first horticultural architect of the day agrees with them in that opinion. In the many excellent houses erected from his designs, the sashes are made permanent, and ventilators are fixed in the front and back walls.

Vines thus early forced, will ripen their wood sufficiently in the open air, without the aid of glass at this season; but those, which are late in ripening their fruit, should have the glass kept on at least until the wood be sufficiently ripened. Some persons are advocates for entirely exposing them, while others advocate the glass being kept on. The end aimed at by both, is the attainment of fully ripened wood; and if that be completely effected, it matters little by which of the means it is accomplished. Those, who merely keep the glass on for the sake of saving the flues and decorative parts of the structure, often sacrifice a more important object than that which they gain. All decorations in culinary hot-houses should be dispensed with, excepting what are necessary and useful, for in such structures that only is in good taste, which is of real utility. In the green-house, conservatory, and tropical plant-stoves, fancy or taste may be certainly consulted; but the plainer the houses are which are intended to bring fruits early to maturity, or to perfection at a later season, the better; provided they be got up in a respectable and neat manner. We have seldom found injury done to the flues by being thus left exposed by the removal of the sashes, and never to such an extent as would induce us to prefer keeping them on.

The crop being gathered, there remains nothing more to be said upon this subject till October, when it will be again mentioned. Where there are other grape-houses coming in, in succession, their management will be exactly such as laid down in the preceding months.

MELONS FOR LATE CROPS.

Melons for crops to ripen in November and the beginning of October, may be obtained by growing them in flued pits, such as are used for nursing young pine-plants, or in pits of any ordinary construction, having pipes laid in them for the

circulation of hot water, which pipes will take up but little space, the diameter of five or six inches being sufficient; and as the first course of pipes will be placed perpendicularly to the lower or returning pipe, less room will be occupied than by using flues of the smallest dimensions. About the middle or end of this month, those plants which are intended for such late crops may be planted out. It is not, however, to be expected that fruits, especially melons, which require all the sunshine we have in the hottest months to bring them to perfection, will either be fine or high-flavored, ripening so late in the season. Plants for this purpose should be raised from seeds sown the latter end of last month, or even the beginning of the present, in any other melon-pits or frames in use. The process of sowing, rearing, and finally planting out being the same as has been directed for melons for more early crops, with this difference, that they can be more depended upon, and as few accidents will attend them, we need not again enter upon that head. The pit is to be filled with well-fermented dung, if considerably exhausted the better, as a mild heat only is required; or, if composed of dung and half-decayed leaves, or tanners' bark, it will give a more lasting and mild heat. This being prepared, and the plants planted out about the third week in the month; the bed may be earthed all over at once, or an addition made to it, as occasion may require. The general management of them from this time till September, when they will be again noticed, will not differ from that of the plants now in their respective stages of growth, either in pits, frames, or under glasses, &c.

For this crop, it is necessary to select sorts of the earliest description; the rule holding almost always good, that those which are the best suited for early crops, are also the fittest for late ones.

AUGUST.

PINE-PLANTS.

Upon the supposition that the fruit be all or nearly cut, a general arrangement of the pine-plants will now be necessary. The old stock of plants, which has just produced their fruit, and has been left in the fruiting-pit to perfect their suckers, is now to be removed entirely out of the house; the suckers carefully twisted off, and laid by in some convenient place till they become a little dry, which will be sufficiently effected in the course of a week. The old plants, now divested of their suckers, are to be thrown away altogether; the bark or leaf-bed thoroughly turned up, and all the exhausted matter carried away. While these operations are going on, it will be convenient to have the flues cleared of soot, and any trifling repairs done to the walls, flues, or roof of the house, that may be deemed necessary. The bed should be again filled up with such a proportion of fresh tan or leaves as will again raise it to a sufficient height. These new materials, as has been already noticed, should, in the operation of mixing, be kept well down towards the bottom, and a sufficient quantity of half-decayed tan or leaves brought up to the surface, in which the pots will be plunged. While the bed is thus preparing, select out of the succession-pits a sufficient number of plants, with which to fill the fruiting-pit again. If it be intended to fruit another set of plants during the autumn, such being considerably advanced already, they are to be fitted for going into this stage of growth by following the same directions as were laid down in February, as far as regards shifting, plunging, and otherwise arranging the plants.

But if it be intended, which is more generally the case, that the fruiting-pits be now filled with those which were succession-plants formerly, and which will now be healthy and strong, if the directions given in the foregoing months have been attended to; preparatory to their being removed into the fruiting com-

partment, it will be necessary that they should be examined as to their want of shifting into larger pots, &c. The directions regarding potting, already given, both as to the mode of performing the operation, as well as the sizes of the pots being kept in view, we need not dwell longer upon that subject, only so far as to say, that the largest sized plants will require pots from twelve to fifteen inches in diameter, and the less strong, proportionably smaller. The pots we would recommend for pines are rather different from those in common use, being not so deep in proportion to their diameters as the pots usually used. We would prefer pots whose depth correspond nearly with their diameter, as being much less likely to risk the burning of the roots of the plants.

The plants being potted, and a little water given to settle the mould about their roots, let them be plunged into the bed about three parts of their depth, for fear of too much bottom-heat; which, if permitted at this time, while the plants have been checked by being repotted, would be liable to start them into fruit, which, at this season, would be far from a desirable circumstance. After they have thus stood for some time, till the violent heat of the bed may have subsided, they may then be fully plunged up to their rims, observing that, in so doing, to set the pots level, and to endeavour to keep them so, by pressing the leaves or tan tightly round them on all sides. The plants should be allowed as much room as possible, not less than eighteen inches from the centre of one pot to that of the next; when they are all plunged, give them a little water, which repeat more freely when the heat has come up. It will be also necessary, after the house has been regulated and cleared out, to give the plants a good washing over-head with the syringe, to clean them of any dust that may have fallen upon them during their removal and potting. After the heat in the bed has come to its full height, watering must be attended to forthwith, in a regular and moderate quantity. The plants must now be kept going on in a steady genial growing heat, supplied with plenty of air when the sunshine is powerful enough to raise the temperature above 80°, which point it should seldom exceed, but be regulated from that to 75° in the day, and from 65° to 68° during the night. This

treatment will be the means of keeping the plants in a fine growing state without endangering their starting into fruit, which, of all things at this season, should be guarded against; for those which start into fruit at this time, may be considered tantamount to being lost.

The plants in the nursing-pit will now have to be put in order to bring into the succession-house, to be there forwarded for fruiting-plants in the course of a year. Many, if not all of them, will require to be repotted, at least most of the strongest of them. The bed in the succession house should be prepared for them, as already directed on former occasions, still keeping down the new or fresh tan or leaves towards the bottom. The flues of this compartment should also be cleaned, and all necessary repairs done to the walls, flues, and roof of the house; the walls should also be whitewashed with lime and water, to give the whole a lighter and neater appearance.

The plants being potted into pots suitable to their respective sizes, should be arranged in the bed in a regular manner, keeping the tallest towards the back and the smallest in front. After being all arranged, the whole should be watered at their roots, and be syringed over-head.

The crowns and suckers, which have been collecting and rooting in the frames or in the front of the nursing-pit, should now be all potted; that is, all those which are rooted and brought into the nursing-pit, to be there forwarded to occupy the succession-pit the ensuing year, and the bed there made ready for their reception, as already directed for the succession-pit. After the plants are plunged, and watered at the roots, let them be syringed over-head, but not immoderately, as they will not be able to resist so much water as those which are farther advanced in growth. Those crowns and suckers which were taken off the old plants, and had been laid by at the commencement of the regulating of the fruiting-pit, should now be planted in the frames in rotten leaves or tan; these beds having also been previously forked up, or renewed for their reception. Some of the strongest suckers may be potted at once in small pots, in light vegetable mould, and they will strike root as freely as those in the rotten tan or decayed leaves.

Our principal object in so disposing of them in that way, is, that they thereby require much less room than if potted, and we have always found them strike roots as freely in that way as when potted from the first. In these frames they may remain till the beginning or end of October, and should then be removed into the nursing-pit, if there be room for them; if not, without crowding the whole too much, the best and strongest should be picked out for that compartment, and the weaker or less valuable sorts kept all winter in frames or melon-pits, if there be not a division of small pine-pits for this purpose, in which all supernumerary and small stock can be kept without fire-heat during winter. This indeed will be no difficult matter, for pines can be wintered in well-constructed pits, and even brought to produce good fruit, by means of dung-heat alone; but they are attended with more trouble, and in many cases with more expence, than where there are pits furnished with flues. The whole stock being thus disposed of, a brisk and lively heat is necessary to be kept up in the nursing-pit and frames; which, if the beds be properly prepared, will be sufficient for some time to come, in order to induce the plants to make good roots. There is, however, a line of moderation to be observed, which every one who manages pines will endeavour never to exceed. Those suckers which are potted without roots should have no water for some days after potting, or at least until the heat in the beds becomes pretty brisk; neither should they be so frequently watered, nor so copiously, as those which have already been furnished with roots, and none over the tops until they be better established, and the heart-leaves beginning to grow. Afterwards water may be freely given at the roots, and occasionally over the leaves. Air should not be very freely admitted until the plants have emitted roots, and are beginning to grow; and during this time they should be partially shaded from the effects of the full sun, gradually accustoming them to bear it as they get established with roots. After they are pretty well rooted, air should be given them freely, so as to keep the temperature during the day from 80° to 85°.

INSECTS AND DISEASES TO WHICH THE PINE IS LIABLE.

Diseases, the pine may be said to have none; and such insects as are found upon them are the effect, and not the cause of any sickly appearance that they may assume. When pines are well managed, and kept in a vigorous, free-growing state, they are not only exempt from insects, but if they should even be introduced amongst them, they will not "*annoy, but leave them.*"

The *white scaly coccus*, or *mealy bug*, is the most injurious insect to the pine, and although it appears almost inanimate, it will soon, if not removed by the application of certain compositions, which appear to be destructive to them, be of infinite injury to the plants; but the best of all cures is good management. Speechly and others describe another enemy of this genus, probably a sub-variety of the former, and which is called the *white mealy crimson-tinged insect.* The brown *turtle insect*, or brown scaly coccus, *Coccus hesperidum*, or bug, also infests the pine. It is nearly allied to the first, but not so injurious in its effects.

Many methods have been tried for the destruction of these insects, with more or less effect. The following receipts have been used by persons long celebrated for their successful culture of the pine:—

"Miller recommended turning the plants out of the pots, and clearing the roots; then keeping them immersed four-and-twenty hours in water in which tobacco-stalks have been infused: the bugs are then to be rubbed off with a sponge, and the plants, after being washed in clear water and dripped, are then to be repotted."

M'Phail recommends the application of a strong and powerful moist heat, founded upon the fact, which has been experimentally proved, that a high and moist temperature is speedily fatal to animals, while it does not injure vegetable life; thus a moist and high temperature appears also congenial to the growth of pines, and while it is kept up, no insects will attack them.

Nicol recommends the following preparation for cleaning such pines as are attacked with bugs; at the same time, he

considers that if the plants be properly managed, no insects will infest them: — "Take soft soap one pound; flour of sulphur one pound; tobacco half a pound; nux vomica an ounce; which boil altogether in four English gallons of soft water, down to three gallons, and set it aside to cool. In this liquor immerse the whole plant, after the roots and leaves are trimmed for potting. Plants in any other state, and which are placed in the bark-bed, may safely be watered over-head with the liquor, reduced in strength by the addition of a third part of water. As the bugs harbour most in the angles of the leaves, there is the better chance that the medicated water will be effectual, because it will there remain the longest, and there its sediment will settle. The above is a remedy for every species of coccus, and for most insects, on account of its strength and glutinous nature. Its application will make the plants look dirty; therefore, as soon as the intended effect may be supposed to have followed, whatever remains of the liquor on the leaves should be washed off with clean water. It would be imprudent to pour a decoction charged with such offensive materials over fruiting plants. Farther, this peculiar dose, for a tenacious insect, is not to be applied indiscriminately to exotics in a general stove, as it might make the more delicate leaves of plants fall off."

Baldwin recommends to "take horse-dung from the stable, the fresher the better, sufficient to make up a hot-bed three feet high, on which to receive a melon-frame three feet deep at the back; put on the frame and lights immediately, and cover the whole with mats, to bring up the heat. When the bed is at the strongest heat, take some fagots, open them, and spread the sticks over the surface of the bed on the dung, so as to keep the plants from being scorched; set the plants or suckers bottom uppermost on the sticks, shut down your lights quite close, and cover them over well with double mats, to keep in the steam; let the plants remain in this state one hour, then take out the plants, and wash them in a tub of cold water previously brought to the side of the bed, then set them in a dry place, tops downwards, to drain, and afterwards plant them. This treatment is sure to kill every insect. It must be observed, likewise, that the crowns and suckers in the beds

heated by linings of dung, without fire-heat, will have all their insects killed, or be kept free from them, if they were clean when planted by the effluvia of the dung." Mr. Knight concludes, "that the destructive agent in this case is *ammoniacal gas*, which Sir H. Davy has found to be instantly fatal to every species of insect; and if so, this might be obtained at a small expence, by pouring a solution of crude muriate of ammonia upon quick lime. The stable or cow-house would afford an equally efficient, though less delicate fluid. The ammoniacal gas, Mr. Knight supposes, might be impelled by means of a pair of bellows among the leaves of the infected plants, in sufficient quantity to destroy animal life without injuring that of the vegetable; and, he adds, it is a very interesting question to the gardener, whether his hardy enemy, the red spider, will bear it with impunity."

Griffin recommends: "To one gallon of soft rain-water add eight ounces of soft green soap, one ounce of tobacco, and three table-spoonfuls of turpentine; stir and mix them well together in a watering-pot, and let them stand for a day or two. When you are going to use this mixture, stir and mix it well again; then strain it through a thin cloth. If the fruit only be infested, dash the mixture over the crown and fruit with a squirt, until it be all fairly wet, and that which runs down the stem of the fruit will kill all the insects that are amongst the bottom of the leaves. When young plants are infested, take them out of their pots, and shaking all the earth from their roots, (tying the leaves of the larger plants together,) plunge them into the above mixture, keeping every part covered for the space of five minutes; then take them out and set them on a clean place, with their tops declining downwards, for the mixture to drain out of their centre. When the plants are dry, place them in smaller pots than before, and plunge them into the bark-bed."

Muirhead, in a communication in the Mem. of the Caledonian Horticultural Society, recommends immersing the plants in a tub of water, in which there has been mixed one pound of sulphur to every watering-pot full of water. With a bit of bass-mat fixed to a small stick, which he dips in water, he displaces as many of the insects as he can; he then immerses the

plants in the liquor, where they remain for twenty-four hours; they are, when taken out, laid with their tops downwards to dry, and are repotted in the usual manner. It does not very clearly appear, what share either the tobacco used by Miller, or the sulphur used by Muirhead, has in the destruction of these insects, or whether the water alone, without mixture of any kind, would not answer the same end; the rubbing off the insects, which the water loosens from the leaves, appears the principal part in the cure. Without stopping to solve this question, Muirhead certainly cleared his pine-plants of insects in a short time, by no other means; and of this fact we had ocular demonstration. Muirhead is one of the best cultivators of pines in Scotland, and his general good culture and assiduity may be the real cause of his pines being healthy and clear, more than any virtue in his sulphurated water.

Speechly recommends the following receipt, which he long used with success in the Welbeck Gardens: "Take one pound of quicksilver, put it into a glazed vessel, pour upon it one gallon of boiling water, which let stand till it gets cold; then pour off the water for use. Repeat this on the same quicksilver (for it will retain its power) till a sufficient number of gallons are provided to fill a vessel intended for the purpose: one in the form of a trough, that will hold eight or ten gallons, is the most convenient, especially for the large-sized plants. To every gallon of this mercurial water, add six ounces of soft green soap, dissolved in a portion of the prepared water; let the mixture stand till it becomes about milk-warm, which is the degree of warmth to which it must be kept during the time of dipping; which operation is performed in the following manner:—Before the plants be taken out of the pots, I would," he says, "advise the brushing off a few of the scaly insects, as in a common dressing, especially towards the bottom of the leaves, where they will sometimes be so numerous, as in appearance to lie one upon another; in which case, the mixture might be prevented from penetrating to the bottom insects. The leaves of the larger-sized plants should be tied together, as they will be more manageable in this form than with their leaves loose, and less liable to be damaged. The plants should then be taken out of the pots, and divested of their

roots, as also a few of the decayed leaves at the bottom. The plants should then be put into the mixture, in which they should remain, with every part covered, for the space of three minutes; then take them out, first letting the tops decline for the mixture to drain out of their centres. The vessel should be immediately filled with fresh plants, and those taken out set in the open air to dry, with their roots downwards; for, by placing them in that position, the mixture will descend, and penetrate to the very bottom of the leaves in the centre of the plants, whereby the insects, which are concealed there, will be totally destroyed. The mixture will change the plants to a sad green color, which will give them the appearance of being spoiled; but as they become dry, they will in a great measure resume their proper hue. During the operation, it will be necessary to add a supply of hot mixture, in order to keep the whole to a proper degree of warmth, as also to make up the deficiency which will naturally happen." The plants having been thus treated, are to undergo a second dipping in the same manner, which will completely clear them of these insects. In preparing the liquor for a second dipping, he directs to add one table spoonful of sweet-oil to every gallon of the mixture. If the oil be incorporated in two ounces of green soft soap and a little warm water, the oil will more readily incorporate with the mixture.

PEACHES AND NECTARINES ON THE HOT WALLS.

From this time, and until the fruit and wood have been fully matured, is the most eligible season for applying fire-heat to flued or hot walls. To attempt to accelerate their growth in spring, by hard forcing, is a most injudicious practice. It is attended with the danger of not only losing the crop of fruit, but also the lives of the trees, of which there is sufficient evidence on record to prove; and almost all attempts to forward a crop by such means, have rarely or ever been equal to those, which have come on naturally until this season, and then been assisted by a slight heat, till they

have ripened. Where there are a great many forcing-houses, the crops of one or two, or more, may by this time be gathered; and as the lights are better off than on, they may be placed on portable rafters against those hot walls, which are intended to be brought forward, and thus accelerate the crops, in many cases, without the aid of fire-heat; or, if fire-heat be added, the maturation of both fruit and wood will be hastened.

The middle or end of the month will, in most cases, be early enough to apply fire-heat, whether the trees be covered with the glasses or not; that, however, must depend greatly on the season, for sometimes we have cold and wet weather in August, and in that case, the fires may be sooner used. At all events, whenever fire-heat is applied, it should be only in moderation; for nothing can be more injurious to the trees than to be placed close against a burning heat on the one hand, whilst the other, as has been observed in April, is exposed to all the vicissitudes of the weather. The fires should be made moderate at first, increasing them by degrees as the cold weather advances. They should be lighted in the afternoon about four or five, and made up for the night by eight. The cavities, if the walls be built hollow, or if only with common flues, will be sufficiently charged with heated air, which will be given out through the bricks gradually during the night. The surface of the walls next the trees, should seldom feel above milk-warm at their hottest time. It should be particularly observed, not to increase the fuel or heat on cold nights, as is the case in the forcing-houses, otherwise both fruit and shoots may be damaged. A mild and steady heat is all that is required, and more than that would be productive of greater mischief than if the trees had taken their chance of the weather. If the fires be thus gradually continued till October, the fruit and wood will be sufficiently ripened. Some trellis the walls, as a preventive for not injuring the trees; no such precaution, however, is necessary, where due regard has been paid to the temperature of the walls, and it only serves as a plea for the more dangerous practice of heating the walls to an unnecessary degree; independently of which, the trees trained to such trellises are

placed beyond the power of the fire-heat, and a constant circulation of air going on between the wall and branches, they are kept, by that means, nearly as cool as if they were trained close to a common wall without any flues whatever.

CUCUMBERS DURING THE WINTER.

With a view to have cucumbers fit to cut at Christmas, a desideratum amongst gardeners, we cannot follow a better course than to give the following extract from a valuable paper in the Hort. Trans., communicated by Mr. Aiton, it being the practice adopted in the royal gardens. For this purpose, seeds of an approved early sort are sown on the twelfth, and a second sowing made on the twentieth of this month, with a view to cultivate them in stoves during the winter. The plants are raised in a well-prepared one-light hot-bed, and when the seed-leaves become nearly full grown, they are potted off into pots of the size known by the name of *upright thirty-twos*; placing two plants in each pot. When these pots become filled with roots, the plants are again shifted into pots of the size called *sixteens*, and removed from the seed-bed into a three-light box or frame, with a sufficient bottom-heat to allow of a considerable portion of air being given day and night, both in the front and back of the frame. About the middle of September, the plants having again filled their pots with roots, and become stocky, are taken from the frame to the pine-stove, and after a few days receive their last shifting, into pots of the following dimensions:—at the top fourteen inches over, the bottom ten inches across, and twelve inches deep, all inside; measure each pot at equal distances apart, having three side drain-holes near the bottom, and a larger one in the centre of the bottom, and each containing about three pecks of earth.

The plants now in these pots are placed on the front edge of the back flue of a pine-stove, on which flue is fixed a *façia-boarding* six inches deep, and extending the whole length of the house, forming all along a trough, or inclosure, for a reserve of compost after the exhaustion of the mould in the pots has taken place. The pots are here placed in

regular order on the mould-trough over the flue, at three feet apart, and remain in this station for succession. A setting of the second sowing is placed on the end flues of the house; underneath each pot is placed an upright circular garden-pan six inches deep, and fourteen inches diameter, which being filled with earth, the pots are placed therein about two inches deep, and the drain-holes being sufficiently covered with mould serve for outlets for the roots.

The temperature of the stove was kept up day and night at 60° or 65°, varying only a few degrees, when the sun or steam produced a sudden increase of warmth. The plants being established, and in vigour, require stopping for laterals and fruit, and those second and third lateral shoots, in their turn, are stopped also, and the blossoms from time to time set as usual for successional supply.

Water becomes necessary only when the surface of the pots becomes evidently dry, and then a slight sprinkling of soft water is given, after being tempered by standing some time previously in the stove; this is sprinkled over the leaves of the plants with good effect.

The house is occasionally steamed by pouring water upon the flues, which produces a fine genial vapour, evidently useful to the plants; but care should be taken that this operation be regulated, so that any scalding of the leaves from it when the vapour is too hot, may be guarded against.

When mildew appears, flour of brimstone, colored leaf-green, with a little soot, is sprinkled over the leaves and shoots affected; and copious fumigations of tobacco are given, to subdue such species of the aphis tribe as may make their appearance. By this simple process, cucumbers have been produced abundantly in the months of October, November, December, and part of January, in all the royal gardens, during a series of years.

Where there is not the convenience of a stove for the reception of these plants, a small pit, heated by hot water, will be found to answer the purpose of growing cucumbers during all the winter months; such pit, however, should be so constructed, as to admit of a person getting in with facility to examine the state of the plants, and to regulate them according

to their wants; as, during that season, the sashes cannot be opened to admit of that operation without running a risk of having the plants injured by being exposed to the cold. Many gardeners, however, contrive to cultivate these plants so as to cut their fruit by Christmas, and often during all the winter months, by using only the common hot-bed and frame. This, however, is a precarious and laborious method, and cannot be effected except with plenty of dung, which is, for the most part, rather a scarce article in gardens. One great objection to the common dung-bed and frame for this purpose, is the too great abundance of steam, which naturally follows a strong bottom-heat, without which a sufficient temperature cannot be kept up during the winter months. To obviate this, pits have been built at the suggestion, we believe, of Mr. Gould, one of the assistants in the royal gardens at Windsor, and one of the most successful cultivators of this plant in the country, the principle of which is founded on just and rational ideas; namely, heating the atmosphere of the pit, by admitting the heat of dung linings to enter it without passing through the body of mould in which the roots are growing. Steam is precluded, as the heat has to find its way into the bed by passing through the tiles or bricks which form the sides of the pit. M'Phail's pits, already noticed, are in principle somewhat similar, but are much more expensive in the first erection, and always require a greater quantity of dung to keep up the necessary temperature. A sufficient degree of steam may be produced at any time in these pits by sprinkling water on the heated brick-work; and still farther to defend the plants from the danger of damping, the shoots are trained to a trellis near the glass, which trellis may be so constructed as to be elevated close to the glass in fine weather, or let down from it when it is unfavorable.

SEPTEMBER.

NURSING PINE-PLANTS.

The directions recommended last month for the plants in this compartment, are applicable also to the present month, as long as the weather continues mild, and while the temperature remains as high as 70° or 72° during the night. On its falling below those points, recourse must be had to fire-heat; but this should be applied with caution at so early a period in the season. However, if the weather be cold and damp, slight fires will be necessary, not only to dry up the superabundant damp in the pit, but also to assist the temperature. The pine-plants of this age, in pits wrought with dung linings should be attended to, and the linings renewed as often as necessary to keep up a genial growing heat, so as not to check the growth of the plants, as they should be forwarded with all reasonable expedition at this time, for during the succeeding winter months they will not make much progress.

Air should be admitted accordingly as the state of the weather will permit. In fine warm days it should be freely admitted, and in close damp weather the plants will be liable to suffer, if kept long shut up from a free circulation, and be apt to damp and rot at their hearts. Where there are no fire-flues, the watering over-head should be gradually lessened, and only given in fine clear days, when the sun is sufficiently powerful to dry up the superfluous damp; but where there are fire-flues, it should be still continued, as by their assistance no danger can accrue to the plants, and the steam produced from the spilt water after the fires are lighted, will be very congenial to the plants, while, at the same time, it will be noxious to their insect enemies. The pits or frames, in which the young pine-plants still remain, should, towards the end of the month, be regularly covered every night with mats, or Dutch reeds, or canvas coverings, increasing the covering as the nights get colder, taking every possible care to fold up the ends of the mats, that they may not conduct the steam of

the linings into the frames or pits in too large a quantity. Those plants which are still not rooted, either in or out of pots, should only be slightly supplied with water, as it is necessary now to withhold that element gradually. Those which are well rooted, and in pots, should have water once in three or four days, as they may require. It should still be given frequently, but less in quantity as the winter approaches.

SUCCESSION PINE-PLANTS.

The directions already laid down for the plants in the nursing-pit, are applicable also to the plants in this stage of growth. The temperature, however, here must be kept as near as possible to 65°. The times of regulation being still at six o'clock in the morning and eight at night. The temperature throughout the day may with sun-heat be allowed to rise to 70° or 72°, but not above that point. The plants must be supplied with a moderate watering once in three or four days, but that element should not now be given in such a quantity as during the former months.

Air should be freely admitted every fine day; and when the weather is less favorable, it should be given in proportion to the state of the temperature of the pit.

FRUITING PINE-PLANTS.

The plants shifted and regulated last month, will now be growing fast, they therefore should be encouraged by every possible means. A mild, genial, though not burning heat, should be kept at their roots, and the plants liberally supplied with water. Liquid manure should also be applied, which should be continued once every week or ten days during their growing season; that is, from the time that they begin to grow vigorously until the fruit be half-grown, after which time it should be discontinued, as tending to injure the flavor of the fruit. Clear water then only should be given, and that reduced in quantity as the fruit attains maturity, as has already been noticed. The application of manure, in a liquid state, is the most convenient mode of enriching the mould in the pots after the plants have been finally potted.

In giving water to the roots of the pines, the middle of the day should always be chosen, at least from September till May; the intervening months being warm, the watering may be performed either in the mornings or evenings. At all times, when the plants are watered at their roots, the water should be applied through a tube, having a funnel at the end, into which the water is poured, and made into several pieces, to be shortened or lengthened at pleasure; the lower end, or that next the plants, should be bent downwards, and perforated with many holes for the water to pass through. By using this tube, the plants can then be conveniently watered from the outside of the pits, without injuring them, or wetting the bed too much. The plants should also be watered over-head once a week with the syringe, and the steaming resumed, by pouring water on the flues and floor of the house, while the flues are sufficiently heated to produce that fine moist exhalation so necessary to the growth of the pine and so destructive to insects.

Many cultivators of the pine water them during summer, and some few during winter also, over-head with a rose watering-pot; this practice hastens the decay of the tan, or whatever other matter the bed may be composed of; and as all plants in the same bed do not require the same quantity of water at all times, we would recommend giving the general waterings at the roots, as above, and the occasional waterings over-head with the syringe; this practice will consume a little more time, but each plant will then be supplied according to its wants.

The temperature, at the times of regulation, should be kept to from 65° to 70°, allowing an advance of 5° or 8° in the middle of each day from sun-heat.

As the winter approaches, care ought to be paid that no water be allowed to remain in the hearts of the plants, either from the watering-pots or from defects in the glass; when such cases occur, the water should be drawn up with a tin tube, or if it be only in a small quantity, it will pass off by evaporation, if the house be shut close up, and a brisk heat thrown into it by the flues. During the summer, pines will sustain no injury from this cause; but from this time until

May, a superabundance of water, either at their roots or lodged in their hearts, will be very injurious to them.

MELONS FOR LATE CROPS IN PITS HEATED BY FIRE-HEAT.

The plants planted out in July will now have spread over the pits, and will be considerably advanced in fruit. If the weather be dull or wet, it will be necessary at the beginning, if not at the middle of this month, to apply a slight fire-heat, in order to forward the fruit, and more especially to dry up damps to which these plants at this season are extremely liable, and which is to them of that injurious nature, that if not guarded against and repelled, will entirely destroy not only the fruit but the plants also.

The temperature in the pits, however, should be kept very moderate at first, and gradually increased as the cold and the season advance. If the temperature be kept during night at 70°, and allowed to rise with sunshine to 80°, there will be a chance of having tolerably handsome, but not well-flavored fruit: the season for imparting flavor being over by the time this fruit will be ripening. Water should be very sparingly applied either to their roots or over their leaves; once in eight or ten days will be sufficient, unless the temperature be kept higher, which, in that case, they will require water more frequently for the welfare of the plants, and to guard against the red spider, which in such pits are apt to make their appearance even at this late period of the season.

The operation of pruning must be attended to, and no more vines allowed to remain on the plants than may be sufficient to nourish the fruit; all dead or decaying leaves should be carefully removed, and all appearance of damp or mouldiness removed. The fruit should be fully exposed to the sun by laying the leaves aside, which may overshadow them; or, if they be carefully lifted up on an inverted flower-pot, or any such article, to within a few inches of the glass, they will enjoy a greater share of its influence. Should the red spider make its appearance, it will be much safer at this season to expel it by sprinkling a little flour of sulphur upon the flues when heated, or by dusting it finely over the infected leaves, than by a too abundant application of water.

OCTOBER.

GENERAL MANAGEMENT OF PINE-PLANTS.

During this month, the same treatment as directed for the former month should be continued. The temperature, however, of each division, should now be reduced gradually a few degrees, say two or three; that is, from 70° or 72° to 69° or 68°. Artificial heat is not to be now applied to excite the plants to grow in the herb, that is, to increase in size, but merely to prevent any check to the roots from cold or damp.

On the approach of cold nights and dull foggy weather at the beginning of the month, fires will be wanted in the fruiting-pit, and probably also in the others; but by the middle or the end of the month they will be indispensable in all the compartments where fire-heat is used. Those pits which have not the convenience of flues will now require strict attention to keep up a sufficient temperature, but great care must be taken not to exceed the necessary degree, for much more caution is necessary in the management of pits heated by dung or leaves in a state of fermentation, than in the compartments heated by means of fire-heat; the former being subject to many changes from the state of the atmosphere and that of the materials with which they are composed, over which the cultivator has little controul. The fires can be lighted or put out in a short time, and thus a temperature can be sustained almost to a single degree for a length of time; whereas, if any material alteration take place in the beds of fermentable matter, either by their falling or rising to too low or too high a temperature, they are not so soon to be rectified. Nothing but attention and observation, and a frequent examination of the watch-sticks in the beds, and guarding the linings against the effects of too much cold, rain, or wind, can guard the cultivator at this season against sudden changes in these compartments.

Air must be admitted as the state of the weather will permit, and should now particularly (as well as at all other times)

be admitted in a regular manner, so that every part of the house or pit may derive an equal benefit from it. A constant circulation of pure air is always necessary to plants confined in an artificial atmosphere, whether they be growing fast or remaining almost stationary, excepting on particular occasions when it is less necessary, as when the plants are forming roots or immediately after shifting, when they are to be kept more close and shaded.

Water should now also be gradually diminished, as well at the roots as over their heads. It is, however, better to give it rather frequently, but gradually in a less quantity, and some of the plants will probably not require any for some length of time. This must be left to the good judgment of the operator, who should examine the pots frequently. It is better that the plants be kept now rather dry than too damp.

VINERY FORCED EARLY THIS SEASON.

The vinery forced early this season, will by this time have its wood sufficiently ripened to admit of the operation of pruning being performed, preparatory to its being put in order for forcing early next year. As soon, therefore, as the leaves fall, or are falling, the wood may be then considered as fully ripened, and this will be the case towards the middle, if not towards the end of the month. The advantages of early pruning, that is, pruning some considerable time previously to the plants being again set in motion, are too obvious to require any comment, more particularly with those which are intended for hard forcing. Plants become habituated, by certain treatments, to change their natural seasons of coming into vegetation, either in respect to their being forwarded or retarded. Thus this vinery, which was begun to be forced in February, may the year following be forced with safety in January, if required. In order, then, to prepare them for thus early coming into vegetation, it is necessary to prune them at or about this time, for, by so doing, the wounds will be completely healed, and no danger arise from bleeding, which would be extremely detrimental to their springing vigorously; and when once begun to bleed, it is not readily

stopped, to which all vines are liable that are not pruned until they be on the point of being put into a vegetating state.

Great has been the difference of opinion regarding the manner in which vines ought to be pruned; and every one who has either written or practised, as a matter of course, lays much stress upon his own mode. We have already observed, that neither the training nor pruning of this tree is of that material consequence to the production of superior crops as some other circumstances, which are connected chiefly with the food with which it is fed, whether from the border in which they are planted and supplied by the roots, or from the atmosphere in which they breathe and are fed by the leaves. If these two points be properly managed, the vine will be found to produce abundant crops under a variety of modes of pruning and training, as every person of observation must have repeatedly witnessed, not only in the vineries in this country, but also in the vineyards on the continent. To have a sufficient supply of proper bearing wood, is the object aimed at by every vine cultivator, and that mode which is adapted to produce this effect is certainly the best.

Some are advocates for long pruning, that is, laying in shoots of great length, while others are satisfied with the short shoots or spurs produced near the older branches, and the whole length of which seldom exceeds a few joints; others probably with greater judgment, adopt a sort of intermediate mode of pruning, by not only retaining some shoots of considerable length, but also a number of short ones, as well as some of the spurs.

The vine is a plant of so accommodating a disposition, that it is capable of being trained almost in any way that the fancy may suggest. The mode of training them directly up the roof, if planted in front of the house, or directly up the trellis, to which they are to be attached, if planted against the back wall, is one as convenient and rational as can be adopted. Therefore, in proceeding to give them their principal or winter pruning at this time, some observation is necessary, so that enough of bearing-wood may be retained, and no more; and that a reasonable portion of the old be removed, not only to make room for succeeding young wood, but to induce a dis-

position of always keeping the vines, as it were young, by never allowing any old wood to remain that can be cut out, unless it be those which are well provided with younger branches, and convey, as it were, their younger shoots towards the more remote parts of the space to be so covered. All old wood that can be thus spared should be first removed, even some of such shoots as may be of several years' growth, and that have acquired a considerable diameter towards the root; such of these as are not well supplied with young bearing-wood, better than any that may be contiguous to them, should be entirely removed from the very bottom. Such shoots as were laid in during summer, and which will have attained a considerable length, should be shortened more or less as the regular distribution of young wood may require; and such of the smaller and short shoots that have been stopped, and treated like spurs, should be shortened into one, two, three, or four eyes, according to their several strengths, and more or less of them removed according as the space may or may not be filled sufficiently with young wood. This shortening in of all the shoots in the house depends much less upon any specified length than upon the regular distribution of young wood throughout the whole; the stronger and well-formed shoots should, however, always be preferred to those which are less strong; therefore, the principal supply of bearing-wood is thus to be selected from the shoots trained in and reserved for this purpose during summer, and the smaller spur-like shoots to be resorted to as substitutes where there may be a deficiency of the former, as the finest fruit, in regard to size, &c., will be produced from the stronger shoots; but grapes, in flavor equally good, will be the produce of such as are of a less luxuriant growth. It should always be a principal object in view in the training of every tree, to secure a sufficient stock of proper wood at the bottom, as all trees are naturally inclined to push stronger towards their extremity; this habit, however, must be counteracted by using the knife more freely towards these parts, and thus ensuring a plentiful supply of wood at those parts, which, if once suffered to become naked, cannot be so readily filled up again. In shortening the shoots, of whatever size, cut an inch or an inch and

half above the last eye, so as not to injure it, as it is likely to push the strongest of any of them; and always make the cuts in a sloping direction, so that no moisture may be induced to lodge in the spongy pith of the wood: this precaution should also be attended to in amputations of larger branches, and the wounds smoothed over with a sharp knife.

The pruning being finished, some recommend to take off the loose outward bark with which the older branches are covered, which may readily be done by rubbing it between the hands, and all that becomes freely disengaged without using much force may be taken away, observing not to injure the smooth bark; and, for greater caution, always make use of the hand, but never the knife only. This removal of the outer bark will be of advantage to the vines, but we would prefer delaying the operation of removing it till shortly before the plants are to be put into a state of vegetation. Clear the trellis and branches of all decayed leaves, pieces of old matting with which the vines have been formerly tied up, and also all tendrils. Then carefully wash the stronger branches of the vines, the trellis, and all the wood-work of the house, with clean water. This being done, anoint the vines and trellis with a wash prepared in the following manner:—Slice down two pounds of soap, but if soft soap can be procured it will be better, of which take two pounds; two pounds of tobacco, or three of tobacco-paper, such as is used in the manufacturing of tobacco, and which contains a large portion of the oil expressed in the process. Put these into a tub, and pour over them as much water as will, when the soap is beaten up into a lather, have a pretty thick consistency, so as not to run off the trees when applied. When these are well beaten up, and all the soap dissolved, add two pounds of flour of sulphur previously worked up separately to the consistence of thick paint; when this is added, the whole should be well stirred, and applied to the shoots of the vines and trellis by means of a sponge, allowing as much as possible to remain upon the branches. This will destroy any insects that may be alive or may be harbouring under the bark of the vines, or at least it will be the means of preventing the return of them when the trees are put into active vegetation. This cleaning should be again

performed in the two following months, as from the nature of the season, particularly if the glass be off, the ingredients will be liable to be washed off by heavy rains, &c.

The shoots and branches should be now regularly laid in and properly tied to the trellis, dividing the whole as regularly over the space as possible, and placing them at regular distances from each other; and should it appear that any shoot is ill-placed, or too many left, they can be now removed or shortened, more particularly the young shoots, so that when they come to break into wood, they may not be too thick and crowded. In regard to the naked stems, some of which will still remain on the vines as conductors of the young wood to the remote parts of the trellis, it matters not how close they are placed together, as from them no shoots are to be allowed to issue; and where it is necessary, some of the young shoots may be trained upon them, which will hide their more naked appearance. The matting chosen for tying up the vines should be new and fresh, as it will in some cases have a considerable weight to sustain; and, in tying them up, care must be taken to allow plenty of room for their future swelling.

The borders of the house may be slightly dug over, which will give a neater appearance to them, until they be again put into a state for forcing; and, if it be deemed necessary, the borders, both inside and outside of the house, may be mulched over with a coating of good half-rotten dung.

By the beginning of this month, the vines in pine-stoves, if any be planted on the outside of the house, and trained up the inside rafters, as is the usual mode, should now be taken out of the house and trained to the front outside, or to stakes placed for this purpose in the ground, where they should remain till the end of December, or till such time as it may be thought proper to take them in again. This has been our practice for several years, but many excellent cultivators do not take them out at all, and we find this was the practice of M'Phail, and is also the practice of Mr. Shepherd, of Sunbury, a commercial cultivator, and of many other successful vine-growers of the present day.

Amongst the various modes of training the vine in vineries,

we will select the following methods, as being applicable for the generality of purposes:—

The mode of Nicol, which he recommended in his works, and which he long successfully practised, is as follows: If the vines be trained up the roof, "there should be three ranges of bearing shoots; viz. one range at the bottom of the trellis, from end to end of the house, reaching from within two feet of the ground to five or six feet upwards; a second reaching from a foot, or perhaps two feet under the tops of these, that is, from within seven or eight feet of the ground to the distance of fourteen or fifteen feet upwards from it; and a third range, reaching from a foot or two under the tops of these last to the uppermost row of wires on the trellis; the shoots of the first or lower range being headed at about five or six feet; those of the second or middle range about seven or eight, and those of the third or uppermost at about nine or ten feet in length; all a foot or two more or less according to their strengths, or to the height or lowness on the plants from which they have issued, and to the extent to which they have sprung, and the maturity they have acquired. The distance at which these shoots should be placed from each other in their respective ranges is about thirty inches, which distance is necessary to give room to the stubs of next year, on which the clusters are to hang, as in this season; and which distance may be varied a few inches, according to the kind of grapes, some growing stronger than others.

"The undermost shoots on the trellis, or those placed nearest to the ground, and which were only trained to the height of a few feet, must be shortened back to two or three joints: it being a principal point in the training of vines always to provide for a supply of bottom-wood, and to keep young wood as near to the ground, or lower parts of the plants, as possible."

Speechly recommended and adopted in the Welbeck gardens the Dutch mode of training, which consisted of perpendicular shoots being induced to issue from two horizontal branches laid in near the ground, in the first or second year's growth of the plant. These perpendicular shoots were to be regularly

renewed every fourth year, and from them spurs issued, which produced the crop, as well as some few shoots laid in with them. During the first three years of this mode of training, few grapes were produced, and probably from that circumstance it has been almost universally laid aside.

Forsyth's method of training vines, which he recommended and adopted in the royal gardens at Kensington, was somewhat similar to the last; but, instead of laying in the shoots perpendicularly, he trained them in a serpentine form, from an idea of making them break more regularly.

M'Phail describes the fan manner of training vines, and which, he observes, has been long practised where there is extent of space. We feel inclined to justify this practice, as being that of all others the most likely to produce an equal distribution of young bearing-wood over the tree with the least trouble or confusion.

Hayward recommends planting only one vine in each house, and allowing it to fill the whole space intended to be covered; founding his theory very justly on the well-known fact, that the greater the distance which the sap has to flow through the vine, the more abundant and high-flavored will the fruit be. He proposes training either in the horizontal manner, from two leading shoots, or in the wavy horizontal manner: he appears to give the preference to the latter plan. The only objection to filling one house entirely with one kind of grape, is the want of variety. Those who have witnessed the abundant crops of fine-flavored grapes produced from the celebrated Hampton-Court vine; the large vine (said to have originated from a cutting of it) in the gardens at Cumberland Lodge, and many others of large size, will be convinced that vines in general have not sufficient roof allowed them, and that one plant will be amply sufficient for a large vinery.

The deputation of the Cal. Hort. Soc. in their Horticultural Tour, describe having seen vines in a garden at Ghent, which were planted outside of the house, and only their bearing branches taken in; the wood produced this year is trained to a trellis outside the house, and the following season is brought in to produce its fruit, while another set of wood is forming outside for the succeeding crops. Even at Ghent,

this method is not always found to succeed, in consequence of the young wood not becoming sufficiently ripened during autumn; consequently, in this country, little dependence can be placed upon it, from a similar cause.

J. Seton, Esq., in a communication to the London Hort. Soc., published in their Transactions, gives the following scientific method of training the vine, and which he has practised in his garden with success.

"The vine having, like other trees, a tendency to produce its most vigorous shoots at the extremities of the branches, and particularly so at those which are situated the highest, it generally happens, when it is trained, as is most frequently done, across and upwards, from the front to the back of the house, that the greater portion of the fruit is borne near the top, while the lower parts are comparatively barren. This takes place whether the branches be made to consist chiefly of vigorous terminal shoots, preserved at considerable length, or the leading shoots be kept short, and lateral spurs be left for the production of the fruit; but in the latter case the evil exists in a smaller degree: for the spurs, or short lateral branches, divert the sap in its ascent, producing, by means of its flowing to their extremities, an approximation to the effect of long branches. The same inconvenience would occur, to a certain extent, if the vines were trained in a like manner in the open air, but it is greatly augmented in a house, in consequence of the air being much hotter, as every one knows, at the top than below. Having observed that the fruit produced on the vigorous shoots, which usually grow at the extremities of the long branches, is generally more abundant, and of a finer quality, than that produced on the short lateral ones, I was desirous to promote the growth and preservation of the former; but the usual mode of training the branches across the house and upwards being subject to the objection above mentioned, and little scope being afforded for it in a house of small dimensions, I thought," he says, "I should obviate these inconveniences in a great measure, and attain another object, presently to be mentioned, by training the branches in a horizontal direction, and keeping the whole of the fruit-bearing part of each tree nearly on the same level."

With a view to reduce these ideas to practice, he planted five vines at the ends of a house twenty-five feet in length, which for this purpose was provided with rods placed horizontally under the glass of the roof, twenty inches asunder, and extending from end to end. The first vine, placed at one end, being trained up to the two lower rods, a shoot of it was laid along each of them, and continued successively from year to year till it reached the other end; then the shoot on the lower rod was turned upwards to the next, and led back upon it towards the stem of the tree, whilst that on the upper rod was turned down, and led back in like manner on the lower one. During this process, a sufficient number of spurs or short branches were left annually on the old wood to produce fruit. When the leading shoots, which had been thus trained in a retrograde direction, approached towards the end, whence the original branches proceeded, preparation was made for a succession of young wood, by bringing forward two fresh shoots from the stem of the tree, and leading them along close to the preceding ones. As these, and the leading shoots of the first branches, were then on their return advancing, the spurs on that part of the old wood to which they had reached were cut out to make room for them, the naked stem only being left. When the second series of branches had returned nearly to the end at which the trunk was situated, the first series, on which there was then but little of the herbage remaining, was cut out at the trunk. Fresh shoots were then brought forward to succeed the second series; and so on without end. It would be superfluous to dwell on the mode of managing the other trees, as it will be perceived that, on following the same principle, they must be laid along the higher rods in succession, two rods being allowed to each tree; and when the stem is not at the end of the house, two branches are to be trained eastward and two westward along the rod. This, in a house of twenty-five feet in length, instead of having only fifteen or sixteen feet to admit of the length of a branch, as would be the case under the usual mode of training across the house, we have a range of thirty feet, which affords ample scope for the long shoots at the extremities: and these I find, when laid in the horizontal

position, and left from three to five feet long, according to their strength, usually bear fruit at all their buds, while the spurs on the old wood are also very productive.

Griffin, a very successful cultivator of the vine, approves of planting outside the house, and introducing the shoot through a hole immediately under the rafters. He trains up one main branch under each rafter, and the fruit is produced from spurs, or side shoots, issuing from the sides of it. These spurs are cut in to one eye, or bud, at every winter pruning. In course of time, this main stem becomes ragged, and too full of spurs; when such is the case, it is wholly removed, having previously obtained a substitute for it from its lower parts, which is to replace the one taken away and managed in a similar manner. The leading shoot of this main stem is stopped during summer, leaving it three or four joints in length, and in the winter pruning, this is cut clean off, and also occasionally a portion of the end of the main stem, when the top of the house becomes too crowded. By this method great regularity may be attained; and as the fruit-bearing shoots extend only a short distance from the main stem, more light and sun-shine will of course reach the fruit, particularly if they be stopped at the first or second joint above the fruit, which is amply sufficient for drawing up nourishment to it. To allow the shoots in this case to attain any considerable length, can be of no real utility, as they will ultimately be pruned off at the winter or general pruning; while, during their growth, they only tend to exhaust a share of the strength of the vine, which will be diverted to the fruit when the practice of stopping them is adopted.

NOVEMBER.

NURSING PINE-PLANTS.

Winter will now be fast approaching, and an opportunity for making up the beds sufficiently strong to last till February or March, may not occur after the beginning or middle of this month. It is therefore necessary that every department of the pine-pits should be substantially made up to last till that time.

Make choice of fine weather, the benefit of which should never be lost, whenever a general arrangement is going on in these departments. Proceed to remove the plants as before directed, by having them carefully taken out of the bed, tied up, and such as may be in want of support from standing loose in the pots, supported with neat sticks. The plants will not now require a general shifting, neither do we think that a general shifting should ever take place, unless rendered necessary by some unforeseen event, which does not often occur; but the plants should be shifted as they may individually require it; thus they should be examined every time that they are taken out of the bed, for the purpose of having it renewed. Such only, therefore, as seem to be in want, should be shifted, and at this time it should be performed with care, so as not to injure the roots nor destroy the balls, unless they be hard, or the roots much matted or decayed; in such cases, the balls should be gently broken, the roots separated, and all decayed ones removed, and then repotted into pots corresponding to the size of the plants. If the roots be much injured at this season, there is little chance of their forming new ones till the spring; therefore, it is of little consequence whether the old decayed roots remain attached to them among the few good ones they may chance to have, and which may be able to support them till the spring, or whether they may be cut out; which, however, cannot be well done without in some degree injuring

the few healthy roots amongst them: such, therefore, as are in a very bad state in this respect should be shifted.

Any dead or injured leaves should be cut off, with the view of giving the plants an appearance of greater neatness and health. The bed should be thoroughly turned over to the bottom, and a large portion of the most reduced matter taken out to make room for a sufficient quantity of fresh prepared tan or leaves, to keep up a due temperature during winter. The tan or leaves now to be introduced, should have been previously prepared, by being fermented and turned over once or twice, in order that every part may have undergone a sufficient degree of fermentation, and be less liable to heat to an immoderate degree when put into the pits, as well as to continue to a greater length of time in a steady regular heat.

"It is a common practice," Nicol very justly observes, "to add a large proportion of new bark or tan at this time, with the idea of keeping up a strong heat to resist the cold of winter, and some also keep up a high temperature throughout winter from the same mistaken idea, than which nothing can be more pernicious to the plants; hundreds of which are cast out in spring, after having cost much trouble and expense. If the season be dormant, so ought and so will be the plants, in despite of all our exertions to the contrary. It is, therefore, a vain and futile striving; a striving against the stream, to force or indeed to attempt to force them into activity, without the congenial help and assistance of that 'life and soul of vegetation,' the sun."

Presuming that the flues have been cleaned and the house white-washed, as advised in the foregoing months, the plants should then be placed into the bed again in the same regular manner already directed, keeping the tallest behind and the smallest in front next to the glass. It may not be necessary to plunge them to their full depth till towards the end of the month, for fear of the heat in the bed becoming too powerful for their roots, which might be highly detrimental to them at this period, more so than at any other; for if they now lose their roots, or have them much injured, they will not be able to furnish themselves with others till the spring. Their remaining, therefore, all winter without roots, or with their

roots much injured, will be the greatest injury they possibly could sustain.

Towards the end of the month, therefore, when all danger of an over-heat has passed, they should be plunged up to the rims of their pots, taking care during the operation to set them level, so that they will contain water sufficient for their nourishment until they be again regulated. The tan or leaves should be kept clear of the surface of the mould in the pots, so that the same effect may be attained, as well as to enable the operator to determine whether they be or be not in want of water. When replaced in the bed, they should have a little water to settle the mould about their roots, and in a fine day be gently dewed over-head with the syringe, to clear them of any filth which they may have contracted during their removal and replunging. The water now used for this purpose, as well as for watering at their roots, should have the chill taken off previously to using, by mixing a sufficient quantity of hot water to the cold, to render it nearly equal to the atmosphere of the house.

The temperature should now experience a further reduction of from 70° or 68°, to 64° or 66°, at which it should be kept during the winter. Attend to mat or otherwise cover up such as remain in frames or pits heated by dung-heat, in order to be able to keep up a temperature equal to the above degree. In plunging the plants into their winter habitations, they may be placed much closer together than they have hitherto been, as being the means of getting in as many plants as possible, with the view of lessening the necessity of so many different compartments.

Continue to admit fresh air as freely as the state of the weather and the heat in the pits will admit of. It is better that the pits should be under their regular temperature for a few hours, than that the stagnated air should be too long confined, observing to shut up early enough in the afternoon so as to admit of the heat of the sun; raising the temperature sufficiently before the pits are covered up. The waterings must now be gradually lessened in quantity, and once every six or eight days will be found sufficient, observing now to give the necessary waterings in the forenoon of the finest days until the return of spring. The syringing over top should

also be given at the same time, and only in a moderate quantity; but in proportion as this is decreased, recourse must be had to the production of steam from the flues, by pouring water upon them as before directed. But in the frames or pits worked by linings of hot dung, it will not be necessary, as there will always be a sufficient moisture arising from the bed to answer every purpose required.

SUCCESSIONAL PINE-PLANTS.

The successional pits will now require also to have their beds turned over from the bottom, observing the directions already given for the nursing-pits. The plants here should also be carefully examined, and all those shifted which appear in want of it; taking care to break their balls as little as possible, unless they be so hard and matted as to indicate a state of absolute want of room. The plants which are the most forward in growth should be shifted into pots of a larger size, in order to give them a chance of making roots or of continuing in growth, if they be so disposed. The temperature by fire-heat, which will now have become necessary, should be kept up to as near 60° as possible, allowing a rise of 5°, that is, to 65° in sun-shine; it should not be permitted to reach a higher degree, but be kept down to that point by means of the admission of fresh air. As the cold weather approaches, the waterings should also be less frequent, and much less in quantity. The syringing should also be more moderately applied, and the humidity of the compartment kept up by means of steam, produced by pouring water on the flues while they are sufficiently warm. Air should be regularly and freely admitted while the weather continues open and fine; but should it continue for many days damp or cloudy, give air regularly over the pits, and keep up the temperature by means of slight fires, even during the day.

FRUITING-PIT.

The foregoing directions are applicable to the plants in this compartment. The bed will require to be carefully turned

over, a large portion of the exhausted matter removed, and a supply of fresh matter brought in to replace it, which has been prepared as directed for the nursing-pits. The plants that require shifting should now undergo that operation, and when replaced in the bed, should be plunged only half or three parts, until the heat of the bed may have been positively ascertained not to be too strong for the roots. Towards the end of the month, the heat will have sufficiently subsided to admit of their being plunged to the rims of the pots. The same precautions must be used to keep the surface of the pots clear of the tan or leaves, for the purpose of allowing their being watered with ease, according to their several necessities. Any dead or decayed leaves should be removed by cutting them off; but at this time avoid taking off any from the bottom of the stem, as their remaining on will prevent the emission of roots from that part till their shifting in spring, when it will be of more service to them. Give a slight watering after plunging, both at the roots and over-head, observing now to take the chill off the water as already directed. They should also be syringed over-head, but only sufficiently to clear them of dust. Water must be now given in a much less quantity each time, giving a little and often, taking care to spill as little as possible on the bed, which would have a tendency to produce a too rapid decay, and consequently a decline of heat before the season will be sufficiently favorable for its renewal. The steaming should be attended to, accordingly as the system of watering is less persisted in. The temperature should be kept as steady as possible at the point recommended for the succession-pit. Air should be admitted as circumstances will admit of, but rather raise the temperature by slight fires throughout the day, than allow the stagnated air to remain too long unchanged in the house.

PEACH-HOUSE.

At this time, the peach-house to be forced next season should be pruned and put in order, for the same course of treatment which has been followed during the past season. (For full directions, see *January*.)

VINERY.

If the operation of pruning and dressing the vinery were not done last month, it should now be proceeded in without delay, observing the rules therein laid down.

CHERRY-HOUSE.

Towards the middle of this month, it will be well to examine the state of the trees in this house, whether they be planted out entirely, or whether they be in large pots or boxes. Those which are in pots or boxes that appear sickly, weak, or that have not a sufficient number of flower-buds upon them, should be taken out and placed with the stock of those trees in preparation, to be from time to time taken into the house. To make up for such trees as may seem worn out, or unfit for present use, take in an equal or sufficient number of fresh trees. (See *January*.) Carefully examine the whole, and let them be now pruned according to their several necessities, that they may be in readiness for forcing again early in the ensuing year. Cherry-trees having been once forced, seldom after require much pruning, as they do not often make much wood under glass; all that may be necessary will probably be to regulate and thin their spurs, when too much crowded, and to cut out the superfluous, and all such as appear weak, or are dead; any breast-wood that may have been made since the crop was gathered, should now be displaced.

The leading shoots, and those in the lower parts of the trees, need not be shortened, except for the purpose of inducing wood to fill up any blank or vacancy. But if it be necessary to shorten them, let them be cut pretty well in, as otherwise they will push very weak shoots at the extreme parts of the trees, and those that require shortening for the above purpose, need not, however, be cut so closely in. If they be headed back one-third or to half their lengths, it will be found sufficient. Such trees as are brought in for the first time, will require to have their shoots shortened in proportion to their strength; for, if left at their whole length, they will

break weak, and if too many buds be left on, many of them will be shed at breaking.

When all the trees have received their necessary pruning, let them be carefully washed all over with the preparation recommended in the *Fruit Garden*, taking care not to rub off any of the buds in the process. When they are all washed, let them be arranged according to their respective heights: the tallest next the back, and the dwarf ones in front. The whole house should be cleaned thoroughly out, the flues cleaned, and all made ready for commencing forcing, either in the subsequent months of January, February, or March.

It is to be observed, that the same directions are also applicable to apricots and plums.

FORCING SEA-KALE AND ASPARAGUS.

These two esteemed vegetables should now be put in preparation for forcing, so that their produce may be fit for the table at a season when few of the delicacies of the garden are to be procured. These vegetables, from their habits of growth, are extremely well calculated for early forcing; the former being much improved by that process. (For directions, see *January*.)

DECEMBER.

GENERAL MANAGEMENT OF PINE-PLANTS.

The rules laid down last month respecting the different compartments of the pines, should, during the present one, be duly attended to. A steady temperature now is necessary, as well as attention to the proper supplies of water and air; the former of which should be given as necessity may require, but not to an excess at this season, when the plants are almost in a dormant state. Air, however, should be admitted on all favorable occasions.

Such of the pits as are wrought by dung-heat, should be carefully attended to, in order that their linings be sufficiently powerful to keep up the necessary temperature within the pits, and that they should be regularly covered up every night, carefully disposing of the ends of the mats, so as not to be left hanging over the linings, which would be apt to confine the too powerful steam within to the injury of the plants, as well as preventing the free escape of the steam from the external linings, and conveying it into the pits. Avoid covering up too soon in the afternoon, unless the heat in the pits be rather low, and take the covering off every morning by sunrise, in order that the plants may enjoy as much light as possible. When snow is falling, or has fallen throughout the preceding night, it should be carefully swept off as it falls; for if the plants be long excluded from the light and permitted to remain long covered with snow, they will consequently suffer according to the length of time in which they are so precluded from the light of the sun. It is indeed true, that in countries such as Russia, the pine-pits and houses are often covered for weeks during winter, when the thermometer is 20° below zero, with mats and even boards to prevent the weight of snow which has fallen upon them from breaking in the roof-glass, and the plants are after all brought to pretty good perfection; but as we live in a more temperate climate,

where we need seldom leave them covered up for more than twenty-four hours at most, we should, therefore, use no less diligence to prevent this comparatively trifling exclusion, and render it of as short and less frequent occurrence as possible.

PEACH-HOUSE.

It may be necessary to remark, that if the peach-house were forced early during the past season, the buds will be much swelled, and be liable to be injured by very severe frosts; therefore, to guard against such an accident, the lights may be put on, but it must be strictly observed that they be drawn down every day, in order to keep the buds from swelling too rapidly. Unless the weather be very severe, they should be even left off all night; the only motive for their being placed on now is to secure the buds from injury from intense frosts.

VINERY.

If it be intended to commence forcing vines in January, the directions laid down in that month respecting the vinery being put into preparation for beginning in February should be observed; but if it be intended not to begin till February, the house must remain in the state in which we left it in October, observing to have the vines and trellis again washed with the preparation there noticed.

It is seldom that the shoots or buds of vines are injured by cold, provided the wood has been properly ripened in autumn; the glasses may, therefore, be with safety left off till a short time previously to their being put into a state of vegetation; and where, from the construction of the houses, the sashes are fixed, air should be admitted as freely as possible to the vines both day and night.

We have noticed already, that opinions are at variance whether the vines should be uncovered or not; in our practice we have often left them covered, and very often filled them with the hardier green-house plants for protection during winter, and as often had them uncovered, without any sensible advantage or disadvantage attending the succeeding crops.

ON THE FORMATION OF HOT-HOUSE BORDERS AND PLANTING THE TREES.

In the preceding twelve months we have conducted the young horticulturist through a series of management applicable to the forcing of peaches and vines, which, if acted upon in fully established houses, where the trees and vines have been planted for some years, and which are supposed to have been in a healthy full-bearing state when we took up the subject in January, will, it is presumed, be attended with success. But, as it not unfrequently happens that additions are made to the extent of forcing-houses, as well as considering that all houses must have been once planted, we will take up the subject in another form, and suppose that the houses are finished, and the planting to commence during winter or the ensuing spring.

To prevent unnecessary repetition, we will suppose the houses are intended to be furnished with borders inside and out, and that the trees are to be planted within the house, waving all comments on the structure of the building, which has already been treated of, and confining our views alone to the general culture of the trees.

PEACH-HOUSE.

The bottom of the peach-house is supposed to be rendered perfectly dry by being properly drained, and the mould entirely excavated to the depth of thirty inches, or three feet, and that the floor has been made impenetrable to the roots gaining a greater depth. Having, in the former part of this work, advised the collecting of various loams and moulds to be always in readiness, and kept in a state of preparation in the compost yard, we proceed to direct, that such as we have already recommended for the peach-tree borders in the Fruit Garden, are what should be also chosen wherewith to fill up the new forming peach-house borders. As soon as the borders are in a fit state to be formed, which may be any time

during winter, when the frost is not too severe, (or if they have been formed in autumn so much the better,) proceed by bringing in the prepared mould, and filling up the excavated space, observing that it must not be attempted if the weather be by any means wet; the mould will be dry, having, as we have before directed, been laid up in ridges, so that the wet could pass freely off after each turning. In filling up the borders, the mould should not be much trodden upon, but allowed to sink of its own accord, an allowance being made for it, by filling the borders up a foot higher than they are ultimately intended to be.

Upon the supposition that the flues and parapet or front wall stand upon pillars, in order that the roots by that means may pass freely out of the house, care must be taken, in filling up the borders, to have all these spaces between the pillars properly filled up with the prepared mould, accordingly as the process of filling the border proceeds. If this be not duly attended to, the mould will naturally sink, and thus a space be formed, which will prevent the roots from gaining the outside borders, being in itself a very serious misfortune, and the cause will not be perceptible until the trees have sustained a material check. If the mould brought in be in a fit state wherewith to fill the border, as far as regards moisture, it will not be amiss to push it in rather firm in such cavities, with the view afterwards of obviating all pressure on that part of the border, and thereby preventing any injury to the roots; but after the house has been finished, and during the three or four subsequent months, these spaces should be examined, and filled up where they sink. The borders being finished, both without and within, and the glasses on, the whole may then be supposed to be ready for planting.

It is a matter of much importance to the future success of the trees, that they be well chosen, and it is of still greater importance to the proprietor, that the selection be well formed, which, however, is no easy task. The many mistakes made by some nurserymen, in sending out trees under wrong names, occur so frequently, that if twelve trees be planted, three or four out of the number prove incorrect; and this is not, nor can be, detected until too late, when the trees are established

and in a full-bearing state. The only alternative then is to grub them up and substitute others, or to bud them with such sorts as may be more desirable. This is not only a disappointment in the loss of the fruit, but those trees which are thus a second time planted, are long (if ever) before they overtake the others; and during the whole of this time, the house has a patched appearance. The kinds being determined on, (see *our lists*,) the next thing to be considered, is the choice of the trees. Some prefer older and some younger trees; but those of two years training, if they have been well grown, be very healthy, not over strong nor luxuriant, and free from disease and insects, as far as can be ascertained, are to be preferred. If it has been anticipated that such would be wanted, it would be an advantage if the trees had been purchased the year preceding, and planted in any favorable aspect, and in a bed of prepared mould, or planted in large boxes, which could be easily taken to pieces, and plunged in the border till wanted. Their removal at this time would be attended with no risk of their sustaining injury, and there they could be trained to answer the situations in which each might be placed when finally planted. Some gardeners will not plant the trees in their houses until they have seen them in fruit. This is acting with certainty as to the kinds of fruits wished for; however, trees of that age cannot be safely transferred from a distance without sustaining some injury, and indeed they can only be safely used for the planting of a peach-house, when they have been grown for a year or two on the walls of the garden, where they are to be afterwards used for planting a house in the same garden. Such trees will be less liable to run into luxuriance of growth, and will therefore come into a bearing state sooner than those which have been planted younger.

In whatever way the trees are to be planted, that is, either as standards planted in the borders in the middle of the house, or trained to the roof, back wall, or in any other way, it is advisable to plant out the trees that are to be considered as permanent at regular distances from each other; which distances should be determined on in proportion to the length, width, and height of the house. Between such trees should

be planted others of a greater age, to come into bearing sooner, say the year following the planting, and to be cut out by degrees as the others advance which are intended to be permanent. Such trees are denominated standards, or riders, and are generally on stems of considerable height, so as to fill the top part of the house, while the dwarfs or permanent ones are filling up from the bottom. Those trees which are planted for temporary crops, should not be less than three or four years trained; and if even of a greater age, if healthy, and having the appearance of plenty of blossom, so much the better, as it is desirable to have them produce fruit as soon as possible; and if the dwarfs thrive, they will require to be removed in three or four years entirely, if intended to be replanted. But it most generally happens that they are allowed to remain, particularly in large houses, until they be cut out by degrees, to make way for the permanent trees as they advance and occupy the space.

The planting should be carefully performed, the roots well singled or separated out, and the pits of a proportionable size for the roots; after planting, they should be moderately watered at their roots, and slightly fastened to the wall or trellis to prevent their being broken. They should not be shortened nor headed down until the end of March or the beginning of April, at which time they will begin to vegetate, and should then be headed in, in the following manner:—The dwarfs, or permanent trees, should have "the shoots on the lower branches cut back to two or three buds, that the wall or trellis may be furnished from the bottom with young wood. The uppermost shoots may be shortened back to half or one-third of their lengths, according to their strength, provided they have been well ripened, and are free from mildew or canker; but if they be anywise diseased or injured, let them be cut so far back as to get rid of the cankered, injured, or diseased parts."

"The riders, or standards, need not be headed nor cut in much; the object being rather to throw them into a bearing state than to cause them to push into strong wood, which would not be so fruitful."

If they have been well ripened, and the shoots moderately strong, a light crop may be expected of them the first year, and a full crop the second after planting.

As the shoots of the permanent trees or dwarfs advance, let them be carefully laid in, and fixed to the wall or trellis, about nine inches apart, and kept carefully free of insects throughout the season.

The shoots of the standards or riders may be laid in closer, and of course in greater number, it not being intended that they should grow so vigorously as those of the permanent trees or dwarfs. In all other respects, their summer pruning, training, &c., is the same as has been already laid down for peach-trees fully established.

During the whole season, the newly-planted trees should be freely supplied with water at their roots, and their branches and leaves should be regularly washed with the syringe or garden engine, to keep the leaves clear of dust, as well as to refresh them and suppress the red spider. This watering over-head should be applied with considerable force every two or three days. Upon the appearance of the green fly, recourse must be had to fumigations of tobacco until the enemy be subdued.

It is of the utmost importance to the welfare of the trees that air be regularly and freely admitted to them during the early part of the summer, and after the middle of June, the house should be thrown open day and night; shutting it up, however, during heavy or continued rains, which, if not attended to, would too much saturate the borders about the roots.

These points being attended to, the trees will be in condition for gentle forcing the subsequent year, and will be in excellent order for regular forcing the third year, which forcing may, if desired, commence by the latter end of January or the first of February.

Should the season chance to be cold, backward, or wet, it may be necessary by the middle of September to shut up the newly-planted peach-house, in order to facilitate the ripening of the wood to the extremities of the branches, and a little fire-heat

during cold damp weather, may also be necessary, still farther to assist that necessary point. As soon as all the shoots of the smaller and middle size become of a brownish color at their lower parts, and the fruit-buds upon them appear full and easily distinguished from the wood-buds, fire-heat may be then discontinued. The stronger shoots of the permanent or dwarf trees will continue to grow later than those of the standard or rider trees; but as such are to be considerably shortened back in autumn, in order to cause them to push wood to fill the wall or trellis, their being ripened to their extremities is matter of much less consequence, provided that they are properly ripened or hardened at their base. When fire-heat is discontinued, and the shoots ripened properly, the trees should be exposed to the full changes of the weather as much as possible, only guarding them against too much cold rain, which is always injurious to the peach-tree. In November they should be pruned, and otherwise put in order, preparatory to their being forced the following spring. (For directions as to pruning and training, see the ***Established Peach-House***, already taken notice of.)

During the summer months after planting, the borders of the peach-house should be mulched, that is, covered with littery dung, or indeed any similar matter capable of preventing the drought from penetrating to the roots of the trees; this is of much use, and is too often neglected, not only in this case, but also in regard to all fruit-trees, planted either on the walls or even as standards. It lessens the labour of watering, and, by preventing too rapid evaporation, keeps the mould round their roots at nearly the same degree of moisture.

VINERY.

The preparation of the new borders of the vinery should be proceeded with, when the weather is dry and not frosty, (provided that they have not been formed in autumn,) as they should all be got ready by spring for the final planting of the young vine-plants. The season of planting vines extends

from Autumn till March, and often later. Vines planted in May and June have succeeded to the fullest expectation; however, where circumstances will admit, any time from January till March may be considered a good season. The borders, both within and without the house, should be prepared by being, in the first place, rendered perfectly dry by draining or otherwise, and this should be done in a substantial manner; for after they are formed, and the vines planted, it cannot be so effectually done, and it is of the utmost consequence to the future welfare of the vines, that they should be placed on a dry bottom. Their roots naturally extend to a great distance in quest of nourishment, and are therefore apt to penetrate beyond the limits of borders, which are too scantily formed for them, either in depth or breadth. When they extend beyond the limits of prepared borders, if the soil be naturally cold and damp, the fruit will not be of fine flavor, and, consequently, many of the berries will shrivel, assume a sickly color, and ripen prematurely, and be not only destitute of flavor, but actually sour. The foundation of the borders should be well drained, and a floor constructed on the same principle as has been recommended for fruit-tree borders, so that the roots cannot penetrate it. Over this floor, a thick stratum of lime-rubbish, or similar matter should be laid, over which the border should be formed of light rich loam, well ameliorated by frequent turning over and exposure to the atmosphere; to this loam, however rich in itself, a moderate quantity of well-decomposed dung should be added, and the whole brought to a sufficient degree of lightness by the addition of well-prepared vegetable mould, to which may be added a portion of lime-rubbish, broken bones, shells, or similar matter.

In the formation of vine-borders, horticultural writers have fully given their various opinions, and the following preparations have been recommended by men eminently successful in the culture of the grape. Speechly, in the formation of the borders in the Welbeck Gardens appropriated for vines, adopted the following method:—"One-fourth part of garden-mould, (a strong loam,) one-fourth of the sward of turf from

pasture where the soil is a sandy loam, one-fourth of the sweepings and scrapings of pavements and hard roads, one-eighth of rotten cow and stable-yard dung mixed, and one-eighth of vegetable mould from reduced and decayed oak-leaves. The sward should be laid on a heap till the grass-roots are in a state of decay, and then turned over and broken with a spade; then put it to the other materials, and work the whole well together."

Nicol recommends the border to be formed as follows:— "One-half strong hazelly loam, one-fourth light sandy earth, one-eighth part vegetable mould of decayed tree-leaves, and an eighth-part rotten dung, to which may very properly be added a moderate quantity of lime or shell-marl: these articles should be perfectly decomposed, and intimately mixed, before planting."

M'Phail recommends to "provide a large quantity of earth of a loamy nature; that from arable-land, or from a ridge in which a hedge-row of hazel, maple, elm, &c., has grown for many years, and has been grubbed, is good, or a spit-deep from a common, which has been long pastured, or from the head or end lands of a corn-field, either of which will do very well."

Griffin, of Woodhall, in Hort. Trans., after having rendered the bottom perfectly dry, it is then covered with brick, stone, or lime-rubbish, about six inches thick, and over this is placed a compost of "half good loamy soil with its turf; one-quarter of rich solid old dung, and one-quarter of brick or lime rubbish, the turf well rotted, and the whole well incorporated." Judd, in a communication in the same work, recommends half rich gritty loam from a common, one-quarter of rich old dung, and a quarter of lime-rubbish, tan, and leaf-mould mixed together. These materials, he recommends, to be kept separate, and turned often during the winter, or before they are used. After being well mixed, but not sifted, he lays them on a dry prepared bottom to the depth of three feet. He uses much less dung than is usual in forming borders for this purpose, being convinced that the vine is rather injured than improved by a too liberal application of that material while in

a young state. The borders being prepared, they may be considered fit for the reception of the young plants.

As is the case, in the planting all fruits, much care should be taken in the selection of the plants, both that they be the desired sorts, as well as that they be plants of fitting size and well rooted, without such be the case, there can be little hope of success.

Plants originated from cuttings, and which have been two years cultivated in pots, and have been properly treated and trained as a single shoot, are most generally preferred, particularly by Nicol, Justice, and others; and although many persons prefer plants originated from eyes, or single buds, the latter, if properly treated, are decidedly the best; but it is difficult to procure them equally strong as the former, particularly in the nurseries. Where such plants are preferred, it is, if possible, better to grow them on purpose, or cause them to be grown by some respectable nurseryman. They are generally better furnished with roots, and always make stronger plants than those, which are propagated either by cuttings of considerable length, or originated by layers. The latter mode of propagating the vine is very generally in use, but they seldom are found to make so great a progress afterwards, as those which have been propagated from single eyes.

An expeditious mode of propagating the vine is often practised by Mr. M'Donald, in the Dalkeith Gardens, and described by P. Neill, Esq. in the Edinburgh Encyclopedia, Art. *Hort.* This mode, however, is not applicable, unless in a garden where there are vines already established, or where permission can be obtained in the garden of a friend. Towards the end of June, or beginning of July, when the vines have made new shoots from ten to twelve feet long, and about the time the fruit is setting, he selects any supernumerary shoots, and loosening them from the trellis, bends them down so as to be able to introduce the bent part of the shoot fully within a pot filled with rich mould, which is kept regularly moist. The shoot, thus introduced, should have a portion of the old wood from which it issues, containing a joint, also covered with the mould in the pot; a moist warm air is maintained in the house

during the time the operation is in progress, and in about a week or ten days, the roots will have formed principally from the joint of old wood sufficient to admit of the shoots being disengaged from the parent-plant. It not unfrequently occurs, that the shoot, thus furnished with roots, has upon it one or two bunches of grapes, which, under his excellent management, are found to come to full perfection, even when disengaged from the old plant. Plants, thus originated by the beginning of July, generally attain, by the beginning of October, the length of fifteen or twenty feet. By these means, and under good management, a new vinery might be stocked with plants in three months as completely as most grape-houses are furnished in as many years, in the way and under the management which too generally prevails. It has been supposed, that plants originated by this method, are not so durable as plants by slower means, but this does not coincide with the opinion of Mr. M'Donald. An enlightened horticulturist observes, that, supposing they were found to be less so, it would be easy to keep grape-houses constantly stored with healthy fruit-bearing plants, and that the kinds might be changed almost at pleasure. When it happens, he observes, that too much bearing-wood has been trained in, the plants would be relieved, and sufficient sun and air admitted, by thus removing two or three shoots; and supposing these to contain each several bunches of some fine sort of grapes, they are not lost, but may be ripened by placing them in any other vinery or hot-house, where they would perfect their fruit. Mr. Loudon, with that zeal for which he is so eminently distinguished, as a promoter of horticultural knowledge, suggests the advantage of ringing the layer at or below the tongue, to facilitate the formation of roots.

The borders and plants being in readiness, they may be planted at any time during the winter or spring, so that it is done before the eyes are too much swelled, or the young shoots begin to break. Some, however, even prefer to plant so late as May or June, and in such cases often succeed perfectly. In planting so late, care must be taken to perform the operation carefully, so that the plants may sustain no

check; which, if it should happen, the progress of the vines would be trifling during the first season. In planting, either at an early or late part of the season, the plants should be carefully turned out of the pots, reducing the ball only sufficiently to disentangle the roots that may have grown in a matted manner round the outside of the balls next the pots. The plants should be placed in the pits made for them just as deep as they were in the pots; their roots singled out carefully, and a little well-broken vegetable mould filled in round and among the roots. When thus planted, a little water should be given to settle the mould about their roots. If planted at an early part of the season, they will only require to be protected from severe frosts, or too much wet, till they begin to push young roots. If planted, after they are considerably sprung into shoot, they will require a moderate supply of water frequently, and to be shaded from the sun for a few days after planting.

As the shoots advance, they should be carefully trained into the trellis, allowing only three shoots to remain on each plant, displacing all the others with the finger and thumb. All laterals should be pinched off, except one or two of the uppermost, which should always be left, lest by any accident the leading shoot be injured or broken, and, in that case they may serve for substitutes, although they are never equal to the leading shoot; great care should therefore be taken to guard the principal shoots from injury; and, in tying them to the trellis, sufficient room should be left in the ties to admit of another shoot of equal size, with the view of preventing any injury from the swelling of the shoots.

The two side-shoots left on each plant should be stopped when they advance, the one from five to six, the other from eight or nine feet from whence they spring. The middle or leading shoot should be carefully trained in, as long as it will grow, without stopping.

Air should be daily admitted in a sufficient quantity, according to the weather, so that the shoots may not be drawn up weak, and the temperature regulated in the early part of the season to about 65°; but, as the season advances, and the

plants become stronger, the temperature may be allowed to rise to 70° or 75°; but the latter point should be considered the maximum, unless for a few hours in clear sun-shine, when the weather is naturally warm. As the plants advance in growth, give a liberal supply of water both at their roots, and over their leaves, to keep them in a vigorous state of growth; for no fruit-bearing tree requires more of that element, while in a growing state, than the vine. Occasional waterings at their roots of the drainings of the dunghill, will be found to be of great service to them; or, as a substitute, water in which rich animal manure has been steeped for some days, and applied to their roots, when it is of the color of porter. The plants should be daily well watered over the leaves with clear soft-water, applied with the syringe with some force, which will tend to keep the red-spider in subjection, as well as refresh the foliage, and keep it clear of dust.

A careful watch should also be kept for the *thrips*, which in dry weather makes its appearance, somewhat similar to the red spider, and will easily be discovered by the curling up of the leaves. On the least appearance of this insect, fumigations with tobacco must be immediately applied, and frequently continued until the insects be quite destroyed. It is no ordinary fumigation that will rid the plants of the *thrips* when once established. It must be applied with greater strength, and continued much longer than for the suppression of the green-fly. Should the latter insect only appear, fumigations less powerful will be sufficient.

This process being adhered to, the vines by the middle of September will have made good shoots, and if the season be very favourable, probably fire-heat will be unnecessary for the purpose of ripening the wood. Should the season be otherwise, and the shoots appear still succulent and green, then slight fires will be necessary. This should, however, be determined, not so much by the state of the weather as by the state of the shoots. If the lower part, by that time, be not turning of a brownish color, it is then decidedly time to apply slight fire-heat, in order to promote the perfection of the wood. It has been justly observed by Nicol, one of our best practical

authors on this subject, that " some would put this matter off, perhaps another month, but if the application of fire-heat be at all necessary, less trouble and expense for fuel will attend the process of ripening the shoots in September than in October. Another consideration is that, as it were, you take up vegetation on the way and hurry her forward to the end of her journey, instead of allowing her to lag behind, and then forcibly push her on against her inclination: a matter of the very first consideration and importance in every species of horticulture."

Very slight fires will be sufficient to effect all that is necessary at this time, but as the season advances, the temperature may be gradually raised, so that the thermometer may stand mornings and evenings about 70°, and at this point it should remain until the shoots be of a brownish color, and sufficiently hard or ripened as far towards their extremities, as it is calculated that they will be cut back to in their autumnal pruning.

As the wood begins to ripen, both air and water must be gradually reduced in quantity until the latter be entirely dispensed with; but this should be done by degrees, somewhat in the proportion in which it is wished that vegetation should stop. The waterings at the roots should be desisted in some time before that of the engine over the leaves, the latter of which will keep the plants less liable to the attacks of the red spider the following season, by destroying great part of its eggs upon the wood of the vines, and also upon the wood-work of the house. By November, the vines will be sufficiently ripened to be pruned for the ensuing season.

THE FLOWER GARDEN.

INTRODUCTION.

MANY and various are the pleasures and advantages to be attained from the study of plants, and the cultivation of them in the flower garden. The first leads to the knowledge of one of the most beautiful and instructive branches of science; and the second furnishes an employment well calculated to lead the contemplative mind, in the language of Shakespeare, to—

> "Find tongues in trees, books in the running brooks,
> Sermons in stones, and good in every thing."

The cultivation of the flower garden must be considered as an amusement extremely well calculated to employ our leisure hours, being one of the most innocent, as well as one of the most salutary employments, that can excite the attention of the human mind. To be employed in contemplating the operations of nature, and in viewing the harmony of her works through the kingdom of vegetables, must make far deeper and more lasting impressions on the mind than all the extravagant vociferations of the enthusiast.

> ———"Not a tree,
> A plant, a leaf, but contains
> A folio volume.—We may read, and read,
> And read again: and still find something new;
> Something to please, and something to instruct,
> Even in the humble weed."

A taste for the cultivation of flowers has long occupied the attention of individuals in this country, and the introduction

of that taste may be traced to a very remote date. It occupied the attention of our neighbours on the continent long before the state of this country admitted of such refinement; and, in some parts, it is still carried to that extent, that the annual exportation of bulbs and roots forms no inconsiderable article of commerce.

This taste for flowers has been of considerable service to horticulture in general. The botanist and florist, although acting on two opposite principles of taste, become valuable assistants to the gardener: the one creates, as it were, an endless assemblage of beautiful flowers, by an art peculiar to himself, while the other imparts much valuable information to him relative to the economy of vegetation.

By his exertions, either personally or pecuniary, our gardens are supplied with the vegetable productions of all climates. To him we are indebted for the humble inhabitant of the arctic regions, as well as the magnificent and lofty productions of the torrid zone; from the humble *Linnæa* to the lofty Palm, with many thousand intervening species and varieties of Nature's choicest gifts, with which our gardens abound.

Politically speaking, public pleasure-gardens must be considered as of vast importance, being conducive both to health and pleasure. For which reason we find, in all great cities, that parks, squares, &c., are laid out for the use of those, whose circumstances or employments restrict them to a town life; nor is this confined to our own country, nor to modern times. The public pleasure-gardens on the continent are numerous, and from being considered public property, are protected by the people with a zealous care; every individual considering that, as he has a right to use them, he is also bound to protect and maintain them; and, although they are open at all times, and to all classes, few instances occur of wanton or premeditated injury being done to them.

The private flower garden, which is now the subject of our consideration, forms part of the pleasure-grounds, which latter are defined to be, all or most of the grounds surrounding the dwelling of the proprietor contiguous to the house, and dividing the park or plantations from it, being often denominated

the lawn, shrubbery, &c. The extent of ground occupied for this purpose is not easily determined, but it is always better to have too much than too little. The taste of the owner, the expense which he may be disposed to incur in properly laying it out, and afterwards of keeping it in order, should be considered; and the natural situation of the grounds and style of the house should not be overlooked. In considering this part of the charge of the gardener, we will, for perspicuity, divide it into different heads, and consider them under the denomination of the LAWN, the SHRUBBERY, the ARBORATUM, and the FLOWER GARDEN.

LAWN.

The lawn is defined to be an open space of short grass-ground, immediately surrounding the mansion or family residence, and when extended in the principal fronts, adds considerably to the neatness and grandeur of its appearance, by laying them open, and admitting a more extensive prospect from the principal windows.

Where there is sufficient scope of ground, the lawn should be as large as the situation will admit of, as, after its formation and planting, the expense is not considerable of keeping it up. The lawn should be bounded by elegant groupes of shrubbery, but not in continued lines, so as to give the appearance of termination to any part. It should be, as it were, lost in the park, from which it can be divided either by ha-has, or neat and substantial wire-fences; which, while they prevent the intrusion of cattle, will not be visible as such from the mansion. Every thing having the appearance of boundary or fence should be carefully avoided, and the planting of the lawn so managed as to harmonize with the scenery that surrounds the whole. Care should be taken, in planting the lawn, not to shut out desirable objects, such as fine trees, picturesque views of plantations, cottages, villages, &c., if at sufficient distance. But such objects as are of a disagreeable nature, where they cannot be either removed or improved, should be planted out. In planting a new lawn, it is often necessary to plant thick, to produce a more immediate effect,

as well as to provide against deaths, and consequently to introduce many trees and shrubs which are not intended to be permanent. In so doing, care should be taken to plant in situations sufficiently apart, and in proper positions, such trees as will ultimately become the most highly ornamental when they attain their full size; for, from want of sufficient attention in this matter, we often see three or four valuable trees grouped together, so that to save one the remainder have to be destroyed, at the same time that there is probably not another of the same species in the grounds. A knowledge of the size and habit to which all trees will attain, is very necessary for those who have the disposal of them while young, and without this knowledge, all planting must be performed by blind chance. This seems to be too little attended to generally, and a knowledge of arborescent vegetables is studied generally as little as if it did not form a part of the general knowledge of which a gardener should be possessed.

The back grounds, or the parts of the lawn at the greatest distance from the house, should be so planted as to harmonize with the scenery immediately behind them, and in general trees of the most lofty growth should be placed there. However, to produce an immediate effect, it is also necessary to introduce trees of the first magnitude more in front, but those should be chosen which are of the most graceful growth and of the more valuable kinds. Shrubs of tall growth, chiefly evergeen, and trees of the second class, should occupy the middle, and in front, those whose height does not exceed three or five feet.

Upon the lawn, fine specimens of rare, beautiful, or interesting shrubs, and trees of humble growth, should be planted singly, such as *Rhododendron, Pæonia Montan, Yucca, Rosa, Rhus, Phillyrea, Oleæ, Magnolia, Lonicera, Laurus, Juniperus, Ilex, Genista, Ephedera, Arbutus, Erica, Cytissus, Æsculus, &c.;* and, in sheltered situations, orange-trees, myrtles, many species of New-Holland plants, of large size, and many other large specimens of green-house exotics, should be plunged out upon the lawn during the summer months, and taken under cover during winter, and their places filled with hardy shrubs from the reserve garden, where an

assortment should always be kept of the most interesting, in a portable state, for this and similar purposes.

SHRUBBERY.

The shrubbery may be defined to be the link which connects the mansion and lawn to the flower garden, or to the other parts of a residence, and is most generally planted either for shelter or shade, although often as a screen to hide disagreeable objects, for which the plants which compose it are better suited than for forest or other trees. "The shrubbery," says Nicol, "is often a matter of utility as well as of ornament; in which case it gives the highest satisfaction. When formed for the purpose of shutting out the offices or the kitchen garden from the view of the house; for sheltering the latter, or the garden; or for connecting the house with the garden and the orchard, the shrubbery becomes useful and interesting."

"Sometimes a shrubbery is formed, merely for the purpose of growing rare shrubs and for obtaining agreeable walks. In this case, it is necessary to be at more pains, and to display a greater degree of taste in the laying of it out, than in the formation of the useful shrubbery. In the former case, a tasteful arrangement of the plants is a matter of less importance than the choice and disposition of kinds that will soonest afford shelter, and ultimately become thick screens."

In planting shrubberies for screens to hide disagreeable objects, evergreens should form the principal mass, as affording a permanent blind, and giving a cheerful appearance even in winter. A few deciduous shrubs, of the most showy sorts, may, however, be with propriety added, which will give relief to the more sombre appearance of the evergreens, particularly while the former are in flower; but, from their nature of annually shedding their leaves, and consequently becoming thin in winter, they are not so well calculated for a permanent blind.

In the disposal of the shrubs, the tallest should be planted farthest from the walk, or front side, and the lower in stature in front; but if an immediate effect be desired, it is better to elevate the ground than to plant trees of too great an age.

It is also a matter of importance that they be planted thickly, as it is an easy task to thin them out when required. Little taste has generally been displayed in the formation of shrubberies, as to the production of picturesque beauty; they are planted too generally in the form of sloping banks, without the least natural beauty whatever, and although in this way they may answer the purpose of blinding out disagreeable objects, they become of themselves objects of little merit when seen even from their best side.

Great attention should be paid in their planting, to give them a somewhat natural appearance, and not that of a surface as regular as if they were clipped with the garden shears. Straight lines should also be avoided as much as possible, and the margin of the shrubbery should be broken with deep indentures or sinuosities, and these should be neatly turfed over and kept mown. The walks which lead through this department should not be to any great distance in a straight line, if it can be avoided, neither should they be too much twisted. There is something in a fine gentle sweep or curve so pleasing in a road or walk, that few are insensible of its beauty. The breadth of the walks should be regulated according to the length and scale of the place, as too narrow walks for principal ones have never a good effect; they should scarcely, under any circumstance, be less than five feet wide, and unless for terrace-walks of great length, should not be more than eight; if of greater breadth, they assume the appearance of a carriage-drive, and if narrower, they dwindle in appearance to a mere footpath.

By combining the more distant parts of the grounds with the lawn and house, by means of shrubberies, much may be done, if executed with judgment. Space does not always give the idea of grandeur, for a limited sphere is often better adapted to the display of ornament and beauty. By good management, a small strip of ground may be varied, by taking advantage of the inequality of the ground (if any), or if it be a level and monotonous spot, art can readily step forward and assist by raising banks, sinking the walks, and planting shrubs in thick masses, chiefly of evergreen species, and conducting the walks in the most circuitous manner, so as not to intersect

each other but as little as possible. However, care must be taken to give sufficient breadth of walk and also a margin of grass on the sides of unequal breadths, which will naturally assist in adding to the picturesque appearance of the whole. This may also be aided by forming the banks to be planted of unequal heights, which banks, in small places, need not occupy much surface at their base, so as to admit of as great a breadth of grass margin between them and the walks as possible; in some parts narrow, where it is deemed necessary either for variety or for the more completely concealing objects which should not be seen, at others broad, and disappearing, as it were, in natural glades in the distance. This margin of grass, where of sufficient breadth, should be planted with the finer species of ornamental trees and flowering shrubs, singly, or in groups of three or five together, which would not be seen to sufficient advantage if planted generally amongst the shrubs.

Some attention to botanical arrangement might be paid in the distribution of the shrubs and ornamental trees, but this must not be carried to the extent likely to infringe upon picturesque beauty. However, such families as *Pinus*, *Juniperus*, *Buxus*, *Laurus*, &c., may be grouped with good effect; and if judiciously done, will give a bolder effect to the whole than if they were planted promiscuously. Fine specimens of larger growing kinds, should be so placed as to give effect and relief to the thicker masses of more humble growth. In the back ground may be placed a few fruit-bearing trees, which will display their beauties in spring by their blossoms, and in autumn with their fruit. In such situations also should be planted the stronger growing species of *Cratægus*, *Prunus*, &c.

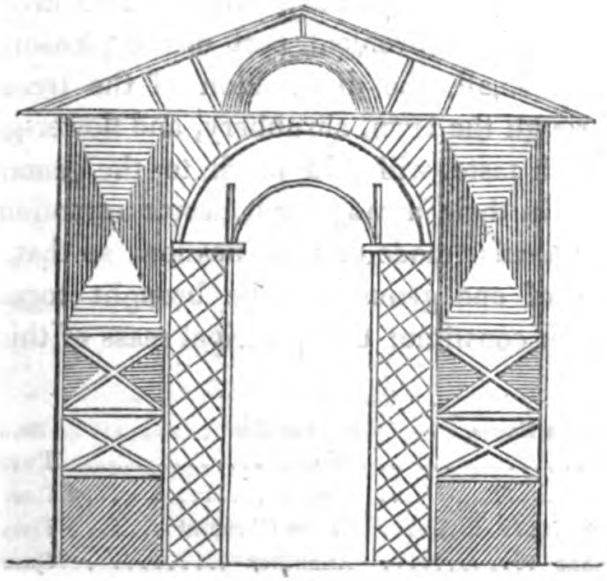
On leaving the mansion, the walks should be conducted through the lawn in a graceful and natural manner to the shrubbery, and should be as much hidden from the principal windows as possible. They should then be continued through the shrubbery, the most circuitous walks leading to interesting objects, so as to relieve the mind and remove the idea that they "lead to nothing;" fine specimens of trees, ruins, either natural or artificial, water, distant views of villages, churches,

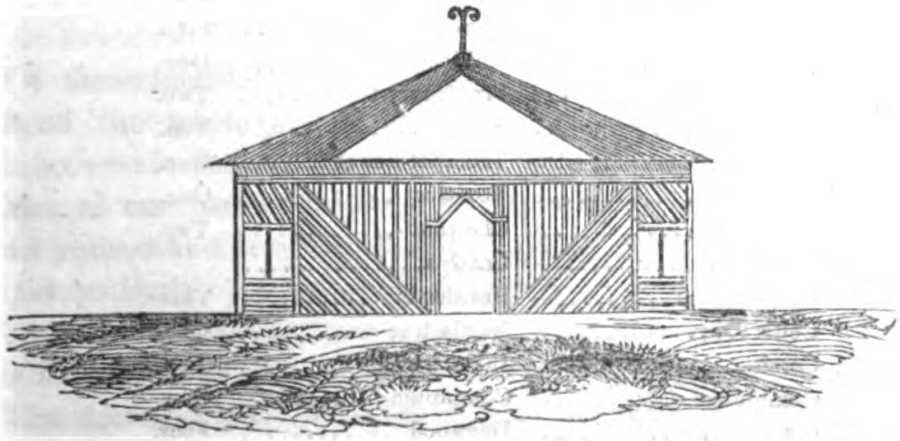
woods, cottages, or the like, will always be pleasing; shorter walks should also be contrived on which to return (as most objects lose effect when seen over and over) as well as for a more convenient mode of reaching the more distant parts of the grounds. Neat resting-places should be placed in different parts, choosing the situation of some in shaded groves, others upon elevated spots, commanding the finest views of the grounds or surrounding country. Much taste may be displayed in the formation of such seats, from the polished temple of Flora, Venus, &c., to the rude roots of trees and misshapen fragments of rock or rude stone. Arbours of living trees of flexible habits, such as mountain-ash, willow, ash, &c., may be planted and formed into bowers, and covered over with creeping-plants, such as *Clematis*, ivy, honeysuckle, &c. Moss-houses of various constructions; root-houses; Russian, Swedish, Lapland, Scotch, and Swiss cottages, should be disposed of in situations peculiarly adapted for them. Sometimes situations are naturally to be found adapted for the one or the other; in such cases, the house should be chosen to suit the situation, and this will always be found to have the happiest effect. Where the situation has to be formed for either, much judgment and taste are required in the arrangement. This is not sufficiently attended to. Thus, a Russian cottage, composed of oak-timber trees, and the adjacent ground planted with laurel and other polished shrubs, natives of southern latitudes, and close-shaven grass lawns, is as preposterous as the chaste Grecian temple in a rocky dingle. The grounds should be chosen or arranged so as to persuade the observer that he is really in Russia, and the house should be composed of the same timber trees used in the formation of cottages in that country, and be of the same form and size. The internal construction and furniture should also come as near to reality as possible. Hermitages and caves are also interesting, when proper situations are chosen. In the former should be kept a small collection of books calculated for private study, and the furniture of this sequestered retreat should be exactly of that simple and useful nature as would be suitable to a recluse.

Caves should be hewn out of the solid rock, or if artificially formed, should be cased over with rough stones, so as to give

as little the appearance of art as possible; the access should be rather rough and even difficult, and the entrance such that the supposed inmate might dispute the passage. The furniture should be of the most rude and simple form possible, such as a savage man might be supposed to use, or such as an outlaw would be glad to accommodate himself with. Nothing like dressed ground should be seen from it, and no vestige of it should be seen until at the entrance.

Rustic seats of various constructions, when properly situated, are no less useful than interesting, even when considered merely as ornaments. The accompanying sketches may be adopted or improved.





In grounds through which streams of water flow, bridges of various constructions should be placed, and here, as well

as in the formation of resting-places, much taste may be displayed, from the neat Doric bridge of polished stone to the rude mountain-bridge of unhewn timber; the one suited for the dressed lawn, and the other for the wilderness or dingle.

ARBORATUM.

The arboratum is a division of the pleasure-ground dedicated to the cultivation of a collection of useful and ornamental trees. It is to be regretted that so few specimens are to be met with in this country of this extremely useful and interesting part of gardening. Such however is the case, and we know not of one complete collection in the country. The arboratum may be situated in any convenient part of the pleasure-ground, if large; but if small, the distribution of the trees should be blended through the lawn, shrubbery, and flower-garden; and, if planted with taste, will add much to the general beauty of the whole. In their arrangement, some attention should be paid to a particular mode of classification, so that at least all the species of one genus may be brought together. The families which constitute the principal mass of this collection, are—

Linnæan Names.	English.	No. of Species.
Acer	Maple	Twenty-one.
Acacia	Acacia	One.
Æsculus	Horse-Chestnut	Five.
Ailanthus	Ailanthus	One.
Alnus	Alder	Eleven.
Amygdalus	Almond	Five.
Araucaria	Chili Pine	One.
Arbutus	Strawberry-tree	Two.
Betula	Birch	Ten.
Bignonia	Trumpet-flower	One.
Buxus	Box-tree	One.
Castanea	Chestnut	Two.
Catalpa	Catalpa	
Carpinus	Hornbeam	Three.
Celtis	Nettle-tree	One.
Cercis	Judas-tree	Two.
Comptonia	Comptonia	One.
Cornus	Dogwood	Four.
Corylus	Nut-tree	Five.
Cratægus	Thorn	Twenty-one.

Linnæan Names.	English.	No. of Species.
Cupressus	Cypress	Six.
Cytisus	Cytisus	One.
Diospyros	Date Plum	Two.
Euonymus	Spindle-tree	Four.
Fagus	Beech	Three.
Fraxinus	Ash	Nine.
Gleditschia	Gleditschia	One.
Gymnocladus	Gymnocladus	One.
Halesia	Halesia	Two.
Ilex	Holly	Three.
Juglans	Walnut	Fourteen.
Juniperus	Juniper	Ten.
Kœlreuteria	Kœlreuteria	One.
Laurus	Laurel	Six.
Liquidambar	Liquid-amber	Two.
Liriodendron	Tulip-tree	Two.
Magnolia	Magnolia	Nine.
Mespilus	Mespilus	Thirteen.
Morus	Mulberry	Nine.
Nissa	Nissa	Four.
Pinus	Pine	Twenty-seven.
Platanus	Plane-tree	Four.
Populus	Poplar	Seventeen.
Prunus	Plum	Fifteen.
Pyrus	Pear	Sixteen.
Quercus	Oak	Fifty-four.
Robinia	Robinia	Nine.
Salisburia	Maiden-hair-tree	One.
Salex	Willow	Thirty.
Sambucus	Elder	Three.
Taxus	Yew	Two.
Tilia	Lime-tree	Five.
Ulmus	Elm	Sixteen.

Of these families, that of QUERCUS, the OAK, may be considered the most valuable. To the common oak, *Quercus robur*, we are indebted for the materials which form the bulwarks of our national safety, and glory as a nation. It has been noticed at a very early period, and is elegantly described by the majority of the ancient poets.

This valuable tree attains a greater size than any other vegetable production indigenous to this country.

The *Quercus sessiliflora*, of English botany, has been more abundant with us formerly than at present; the superior qua-

lity of its timber may have been the cause of its almost extirpation. Few trees of any considerable size are now to be met with compared with the *Quercus robur*. The roof of Westminster-Hall, long supposed to have been of chestnut, is of this timber, and has stood undecayed for ages, and is supposed to have been brought from Ireland.

The evergreen oak, *Q. ilex*, and its varieties, add considerably to the beauty and elegance of our shrubberies and pleasure-grounds.

The Cork Oak, *Q. suber*, besides being an ornamental tree on our lawns, is of much real utility; the exterior bark is imported by us from the south of Europe, to be manufactured into corks and other useful purposes. The bark of the cork-tree, as well as the acorn, is of some use in medicine, being both reputed astringents. The Spaniards burn the bark to make that kind of light black which painters call Spanish black. The Egyptians made coffins of cork, which being lined with a resinous substance, preserved dead bodies uncorrupted. The Spaniards often line the walls of their houses with it, which renders them warm, and corrects the moisture of the air.

The Turkey Oak, *Q. cerris*, and its varieties, is now found to be an extremely useful timber tree, and in many situations would be more profitable, if planted, than those of our own country.

Next to the oak family, in point of general utility, may be ranked the pine, or fir. Of this family, few arrive in this country of a size to be of general utility, excepting the Scotch *Pinus sylvestris* and larch *P. larix;* however, the timber of several other species are imported by us both from America and the north of Europe, which are well known for their durability and usefulness in building: some of the Norway houses, built of entire trees of the red fir or pine, are supposed to have stood upwards of four hundred years. In Guldbransdale, the house is said to be still standing in which King Olaf lodged five nights above seven hundred years ago. As ornaments to the park, the lawn, and pleasure-ground, the whole of this family become exceedingly interesting. Of

these, the *P. clanbrassiliana; P. lanceolata; P. pinaster; P. longifolia*, although a native of the East Indies; *P. cembra, P. pichta*, and *P. adunca*, are highly interesting.

Nearly allied to this family are the magnificent family of *Araucaria*, the Chili pine; *A. imbricata*, is found to be sufficiently hardy to stand out in favorable situations. It is, however, still rare. Should it become more common, no tree with which we are acquainted would be a greater ornament to our arboratums.

The CHESTNUT family afford us trees very ornamental to our parks and lawns; and the fruit of the common chestnut, *Castanea vesca*, is used in our deserts. It attains a great size, and is a valuable timber-tree.

The BEECH is also an ornament to our parks and pleasure-grounds. The variety with dark purple leaves, produces a good effect in garden scenery; it was originally discovered in one of the German forests, and is now generally met with in our pleasure-grounds. It is botanically considered only a variety of the common beech, *Fagus sylvatica*. It may be mentioned, as an additional illustration of the importance of this family, that the seeds of the *F. sylvatica*, when freed from the husk or outer envelope, afford by pressure one-sixth part of a fixed oil of excellent quality; and considered, when properly managed, to be equal to that of olives. This oil is prepared in great quantities in Germany and the north of France, from seeds obtained from the forests of Crecy and Compeigne.

The POPLAR family afford us a greater variety of beautiful foliage than that of almost any other tribe; that of *Populus trepida* and *P. tremula* possess a singular motion of their leaves, which has not been satisfactorily accounted for. The fragrance of *P. balsamifera* is very agreeable, and consequently it often finds a place in our shrubberies. It seems a neglected genus that merits more general cultivation. It is of very rapid growth, and flourishes in situations where few other timber-trees would thrive. Several of the species also promise to become useful for building purposes.

The BIRCH family are peculiarly interesting; the white birch, *Betula alba*, and its varieties, assuming very graceful

habits of growth; that of the weeping variety, *B. alba var. pendula*, is much cultivated. In some places it is almost naturally as abundant as the varieties with upright branches.

The ALDER is a neglected family; few species being generally met with in cultivation.

The NUT-TREE, *Corylus*, although properly belonging to the orchard or fruit-garden, should nevertheless be always planted in a collection of trees. Their habit of growth, and their growing in the shade, render them useful in this department, as underwood in the arboratum, where it is wished to blend picturesque beauty with scientific arrangement.

SALISBURIA.—Of this genus we have but one species, *S. adiantifolia*, a native of Japan. With us, in favorable situations, it becomes a tree of the third class, and is extremely interesting; the foliage being so singularly divided. Fine specimens of this tree are to be seen in the grounds of the Mile-End nursery.

The PLANE-TREE attains a considerable size with us, and is very ornamental. The *Platanus orientalis* and *P. occidentalis* are described as growing to an amazing size; the latter is a native of America, where it has been known to attain the circumference of forty feet at five feet from the ground; and T. André Michaux measured one of still greater dimensions, and in full growth. These trees are, from their rapid growth and fine general outline, highly ornamental; but they require a good soil, and one that is neither too thin nor too dry.

The MAPLE family are a very ornamental tribe of trees. The *Acer campestre*, common maple, has long been valued, on account of its timber and quick growth. The sycamore, *A. pseudo-platanus*, is also a magnificent tree of the first class; the wood of which is both beautiful and useful. The sugar maple, *A. saccharinum*, is an extremely hardy tree, and is found to prosper in Canada under the most rigorous cold, in lat. 48°, nearly corresponding in temperature to lat. 67° in the north of Europe. The juice is also converted into excellent vinegar, in the usual manner practised by vinegar manufacturers. Sugar is also obtained from the juice in considerable quantities (hence the name). Some years ago, the Prince

of Augsburg planted above a million of maple-trees of one of the European species, for the express purpose of manufacturing sugar for home consumption.

The Ash family, *Fraxinus*, is both useful and ornamental. The common ash, *F. excelsior*, attains a large size in this country, and has long been in demand by the coach-builder and the makers of agricultural implements. Evelyn, in his Sylva, states, that trees of this species, of forty years growth, from seed, sold for thirty pounds each; an extraordinary price for timber in those days: and that a gentleman had a plantation of this tree, of his own planting, which was valued at fifty thousand pounds. Of this species there are five curious varieties to be met with in collections. Of these, the *F. excelsior var., argentia,* and *var. pendula,* are great ornaments to the lawn or shrubbery, and the yellow-barked, or golden *F. aurea,* is not only while in leaf, but also when without leaves, an interesting tree.

The *F. ornus,* or manna ash, produces the medicinal manna, and is also an ornamental tree. In the country to the eastward of the Missisipi, including Canada and the United States, the younger Michaux supposes not less than thirty species of this valuable tree to exist; all of which have never been at any period in this country. Since the beginning of this century, no less than fourteen species have been introduced from North America alone; still it is surprising that not above four or five species are in general cultivation, even when considered as ornamental trees only. The *F. Americana* is no less interesting from the magnificence of its growth than for the beauty of its foliage: it abounds from the northward of Hudson River to the southern limits of Jersey and Pennsylvania, and attains the height of eighty feet. It also endures the severest cold of Nova-Scotia and Canada without any diminution of size; and where planted in this country bids fair to prosper to the utmost of our expectations.

The Æsculus family are exceedingly ornamental, and are more generally met with in pleasure-grounds than any other family of arborescent plants. The beauty of their flowers, as well as the elegant palmat form of their foliage, have led to their being more generally admitted into the pleasure-ground than

almost any other tribe of trees taken collectively. From the many venerable specimens of *Æ. hippocastanum*, the common horse-chestnut, which are to be met with surrounding the mansions of the great, seem to prove the attachment which our ancestors entertained for this tree, and also that some care had been paid to their early cultivation, as they are natives of the north of Asia, and introduced here in 1629. The beauty of the flowers, and elegant form of this tree, and not the value of its timber, render it an object of interest. This tree is supposed to have been brought into Europe by way of Vienna, from thence into Italy, and then into France and England; but Langley is of opinion that it was brought into England from the Levant.

The *Æ. pavia*, *Æ. flava*, *Æ. parviflora*, *Æ. discolor*, and *Æ. hybrida*, lately and very justly formed into a separate genus, under the denomination of *Pavia*, are of humble growth compared with those allied to the *Æ. hippocastanum*; they are nevertheless exceedingly ornamental, planted either on the lawn or in the fronts of shrubberies.

The Lime family, or Linden-tree, *Tilia platyphylla*, *T. europea*, of English botany, are amongst the most elegant ornamental trees, and attain a large size. When planted sufficiently distant from other trees, they often assume a head perfectly conical. Our ancestors seem to have chosen them for planting avenues, when that style of planting was in vogue. Evelyn was so partial to the lime, probably from its supposed medicinal properties, that he purposed planting one before every door in all the broad streets of London.

The Walnut family, *Junglans*, are both ornamental and useful as a timber-tree, and the fruit adds to the variety of our deserts. They are natives of America. The *J. regia* common walnut is, however, indigenous to Persia, whence it was brought into this country. It is said that trees of this species, which have their fruit beaten off instead of being gathered, are more fruitful; and, agreeably to this idea, the Italians beat or thrash their trees with poles full of nails or stubs of iron, on purpose to lacerate the bark.

The Elm family.—In point of utility, few trees can surpass our native common elm, *Ulmus campestris* (of English

botany,) and its varieties, as a timber-tree; and many of the species are also extremely interesting for their graceful habits and diversity of foliage. The Hort. Soc. seems, from its collection of this genus, to pave the way for their more general cultivation. The various species may be propagated by being grafted upon the Dutch or English sorts.

The DATE PLUM, *Diospyros Lotus* and *D. virginiana:* the former a native of the south of Europe, and the latter of America; two interesting species. From the bruised fruit of the latter, cakes are formed, which are dried in an oven, and warm water being added to them, produce a liquor which, when fermented, is used as beer. With us, the fruit is not likely ever to arrive at any degree of perfection, but the beauty of the foliage is sufficiently interesting to deserve a place in our shrubberies or upon our lawns.

The HORNBEAM family.—The common hornbeam, *Carpinus Betulus*, attains the size of a tree of the first class when raised from seed, but unfortunately this tree, like too many of our best ornamental trees, are propagated from layers; by which mode of propagation, they are found to succeed at almost any period of the year. The consequence is, that so few trees of this species are to be met with of a full size; a stinted progeny being the reward of a mode of propagation so unnatural.

ALMOND family.—Of these, the common almond, *Amygdalus communis*, is well known for the beauty of its blossoms in spring; of this species we possess several varieties. The *A. communis* is supposed to have been introduced from Africa into Italy, and thence into this country; and although a fruit-bearing tree, still with us it cannot be considered generally as being valued for that property, as for the beauty of its blossom. It attains the size of a tree of the fourth class, and produces ripe fruit in favorable situations.

The TULIP-TREE, *Liriodendron tulipifera*, attains with us the size of a large and lofty tree, and is well suited for the lawn or arboratum; the beauty of its foliage, together with its large white flowers, render it altogether one of the most interesting of our large growing trees for garden scenery. In

America it attains the size of a tree of the first class, often growing to the height of forty or fifty feet of trunk, and thirty feet in circumference, and is considered a valuable timber. Canoes are formed of the hollowed trunks. The leaves grow irregularly on the branches on very long foot-stalks, and are of a peculiar structure, being composed of three lobes, the centre one of which is much shortened, and appears as if cut off and hollowed in the middle. The magnificent large tulip-like flowers are produced with us in July, at the extremity of the branches.

Plum family.—Of this family, with us the *Prunus padus* sometimes attains the size of a large tree, but most generally assumes the habit of a shrub of the largest size. Pennant mentions seeing one in the gardens of the Duke of Queensbury seven feet and a half in circumference. The whole genus is exceedingly interesting, from the cultivated plum of the highest flavor to the insipid sloe, *P. spinosa*. All of this genus deserve situations in our pleasure-gardens, and are much valued, on account of the fragrance of some and the beauty of all their blossoms. The cultivated plum, *P. domestica*, with training, attains the size of a tree of the third class, and is much prized by the cabinet-maker.

The Cherry family are nearly related to the latter in many respects; but, as forest trees, the cherry is more valuable, although the fruit of the uncultivated kinds are less extensively useful. Two of our native cherries are valuable as timber-trees; the black cherry, or Guigne of the Scotch, *Prunus cerasus*, and the red cherry, *P. avium;* both species attain the size of trees of the second class, and are ornamental in our woods in spring, from the beauty and profusion of their blossom; in summer, their fruit is both grateful and high-flavored; and in autumn, the foliage early takes beautiful tinges of red, which render them great favorites of the artist. The gum which oozes from *P. cerasus*, is said by Hasselquist to be very nutritious; he asserts that, during a siege of two months, above a hundred men were kept alive by no other sustenance than a small piece of this gum, which they each suffered to dissolve gradually in his mouth. The timber of

this tree is of great value, and for many purposes equal to mahogany.

Laburnum family, *Cytisus laburnum.* Of this species there are supposed to be two varieties; that which is called Scotch laburnum is most prized, as attaining a greater size, as well of timber as in the foliage and flowers. As an ornamental tree, on the lawn or in the skirts of plantations, it stands unrivalled, and is generally admired both for its large trifoliated leaves and elegant bunches of yellow flowers; often exceeding a foot in length. As a timber-tree it is also valuable, and is found to attain a large size in soils of the poorest description. It is to be regretted that too little attention has hitherto been paid to the cultivation of it as a timber-tree.

Robinia family.—Of this family, the *Robinia pseudo-acacia,* or false acacia, is inferior neither in point of beauty as an ornamental tree upon our lawns, nor as a timber-tree of the second or third class, to any tree cultivated. Its beautifully pinnated foliage, and elegant white blossom, render it worthy of being extensively cultivated as an ornamental tree, and its great durability renders it equally worthy of cultivation as a timber-tree. It is much esteemed in America for its durability, and is always used where timber of that nature is required. The other species of this beautiful genus are equally interesting as ornamental trees, either on the lawn or in the shrubbery.

Mulberry family. Of this family, the *Morus Nigra,* the common black mulberry, although considered as a fruit-bearing tree of great value, is not undeservedly often planted on the lawn, and probably it is the best situation for it. It has been long cultivated in this country, and appears to be a tree of great longevity. As a timber-tree it has no pretensions, as being of slow growth, and attaining only the size of a tree of the third or fourth class. The *M. rubra* attains the size of a large tree, often seventy feet in height, and of a proportionable diameter, in Virginia and Pennsylvania, and probably might be with advantage planted in our most sheltered woods as a timber-tree; on our lawns it cannot fail of being admired, as well as its associate the *M. alba.*

Few evergreens with us attain the size of timber-trees, those of the genera *Quercus* and *Pinus* excepted. For a list of the principal of them, with their heights, &c., see the *Systematic Catalogues*.

FLOWER GARDEN.

Almost all writers on this subject agree in placing the flower garden near the house, that it may be readily had access to at all seasons. In small places, or cottage or villa residences, this may be desirable; but in places of considerable extent, and particularly where the mansion is large, we would propose to have the flower garden at some reasonable distance from it, and to be reached by a sufficiently broad and dry gravel-walk, extending through some part of the lawn and shrubbery. In all cases, unless in small villas or cottage residences, the flower garden should be entirely concealed from the windows of the house, and be placed, if circumstances will admit of it, in the shrubbery. Situations are, however, often to be found naturally calculated for the site of the flower garden; and these situations should, in most cases, direct the designer as to style, form, and extent. Natural situations never should be lost sight of in selecting a station for the flower garden. The surrounding scenery, both as regards shelter and picturesque beauty, will, in many cases, be found better and more interesting when almost naturally formed than when artificially planted. Irregularity of surface is often desirable in the choice of a situation for a flower garden, and many attempts have been made to attain this artificially. Of this sort of art was Pope's garden at Twickenham; and Lord Harcourt's, at Nuneham, was upon the same principle; both much admired, and both the production of poets: the latter being laid out by Mason, and the former by its owner.

Where the proprietor has a taste for flowers, and the situation of sufficient extent, it will be found, in most cases, to have the happiest effect to have several small flower gardens in preference to one large one. Abercrombie justly observes, that to cover twenty acres with mere flowering plants, would

be puerile and ridiculous, as it would exceed the moderation with which nature scatters her ornaments. Indeed, flower gardens of such extent partake more of the nature of the pleasure-grounds, and admit of a great portion of the surface being covered with grass, as well as the borders being planted with shrubs and trees of the less lofty species; without which, the whole would have a naked and mean appearance. Flower gardens upon a moderate scale, rather small than otherwise, admit of their being kept with greater neatness, and will therefore be the more pleasing; and if properly disposed through the pleasure-ground, cannot fail of adding much to its interest. Thus a garden might very properly be denominated the winter garden, planted chiefly with evergreens; however sombre their appearance might be in summer, when all around is gay, still in winter it would give rise to pleasing associations in beholding them retain their verdure and clothing at a season when the other flower gardens are naked and bare.

Another might very properly be denominated the American flower garden, and should be situated in rather a damp situation, or rather one that could be rendered so during the heat of summer by partial irrigation. Such a garden may be complete of its kind, having not only herbaceous plants of great beauty, but also shrubs, deciduous and evergreen, as well as many highly ornamental trees. The soil of which it should be composed, should be of the sort called peat or bog-mould; and being of a very dark color, will form a contrast with the brilliant flowers of which American plants are eminently possessed.

Another might be styled the Botanic flower garden, where a collection of hardy plants might be cultivated to a great extent and variety, and planted according to some arrangement, either natural or artificial. The arrangements generally adopted is either that of the sexual or Linnæan system, which is strictly artificial, and therefore less fit for planting a garden by, as it brings together plants that have few or no relations to each other, and destroys that harmony which is so gratifying in viewing natural families. The arrangement of Jussieu has much the best effect in garden scenery, as well as corres-

ponding better with their cultivation. For private botanic gardens, where the collection is not completed at its formation, but yearly additions made to it, the most convenient method of disposal is by grouping upon turf; and as the plants of any class increase, the beds can be enlarged in proportion, by appropriating part of that which was turf into border for them. These groups should be of the most irregular forms possible. A walk of gravel should be so contrived as to make a tour of all the groups, and that of a continued scroll, as in the accompanying sketch, may be the most convenient. In this sketch we have adopted the sexual system of arrangement, and have given a group or clump for each of the twenty-four classes, (numbered 1 to 24,) not including aquatic plants, or such as are not conveniently cultivated in the borders. Aquatic, bog, and Alpine plants, particularly such of the latter as are liable to perish in winter, or be overlooked in consequence of their minute growth, should be cultivated in groups by themselves.

25, 25, rock-work, where such Alpine plants may be cultivated as would be liable to be lost or overlooked if in the general arrangement.

26, 26, should be rendered capable of retaining water sufficient for the cultivation of such as are natives of bogs or watery places.

27, a border prepared for a collection of plants with variegated leaves, or such as degenerate into singular varieties or monstrosities.

28, 29, 30, and 31, borders for dahlias, carnations, pinks, bulbs, and similar showy flower garden plants, and in summer to be enriched with scarlet geraniums, and other interesting green-house plants.

Flower gardens, laid out according to systematic arrangement, will only be appreciated by those who are attached to that delightful study, or by such as pride themselves in the number of species that they possess. Few attempts have been made in this country of blending botanical arrangement with picturesque beauty in our flower gardens; that of the celebrated Dr. Darwin was probably the most complete. The numerous species of plants which necessarily enter into a botanical arrangement, although extremely interesting to the lover of that

science, are yet overlooked by the majority of persons, and by many are considered as mere weeds; and while such ideas

exist we cannot expect that this sort of flower garden will become by any means general.

The Changeable Flower Garden. To this style of gardening the Chinese are extremely partial, and they are well skilled in it. It is by no means an unusual circumstance for a mandarin to have the whole of his flower garden completely changed in the course of one night, not only in the arrangement of the plants, but also in that of the beds or compartments. For this purpose, the plants are all portable, and are cultivated in a reserve-garden in pots; and when any individual plant or genus of plants decays or goes out of flower, others are immediately substituted for them; and when the whole are to be changed, they are removed to the reserve-garden, where there is always a stock kept up sufficient to replant the whole. Gardens of this description are described by Sir W. Chambers in his work on oriental gardening. The Chinese, he observes, are particular in the arrangement of their flower gardens; they do not scatter their flowers indiscriminately about their borders, but dispose of them with great circumspection along the skirts of the plantation, or other places where flowers are to be introduced. They reject all that are of a straggling growth, of harsh colors, and poor foliage; choosing such only as are of some duration, which grow either large or in clusters, of beautiful forms, well-leaved, and of tints that harmonize with the greens that surround them. They avoid all sudden transitions, both with regard to dimension and color, rising gradually from the smallest flowers to the hollyhocks, pœonies, sun-flowers, carnation poppies, and others of the boldest growth; and varying their tints by easy gradations from white, straw-color, purple, and incarnate, to the deepest blues, crimsons, and scarlets. They frequently blend several roots together whose leaves and flowers unite, and compose one rich harmonious mass, such as the white and purple candy-tuft, larkspurs, and mallows of various colors; double poppies, lupins, primroses, pinks, and carnations, with many more of which the forms and colors accord with each other; and the same method they use with flowering-shrubs, blending white, red, and variegated roses together; purple and white lilacs, yellow and white jessamine,

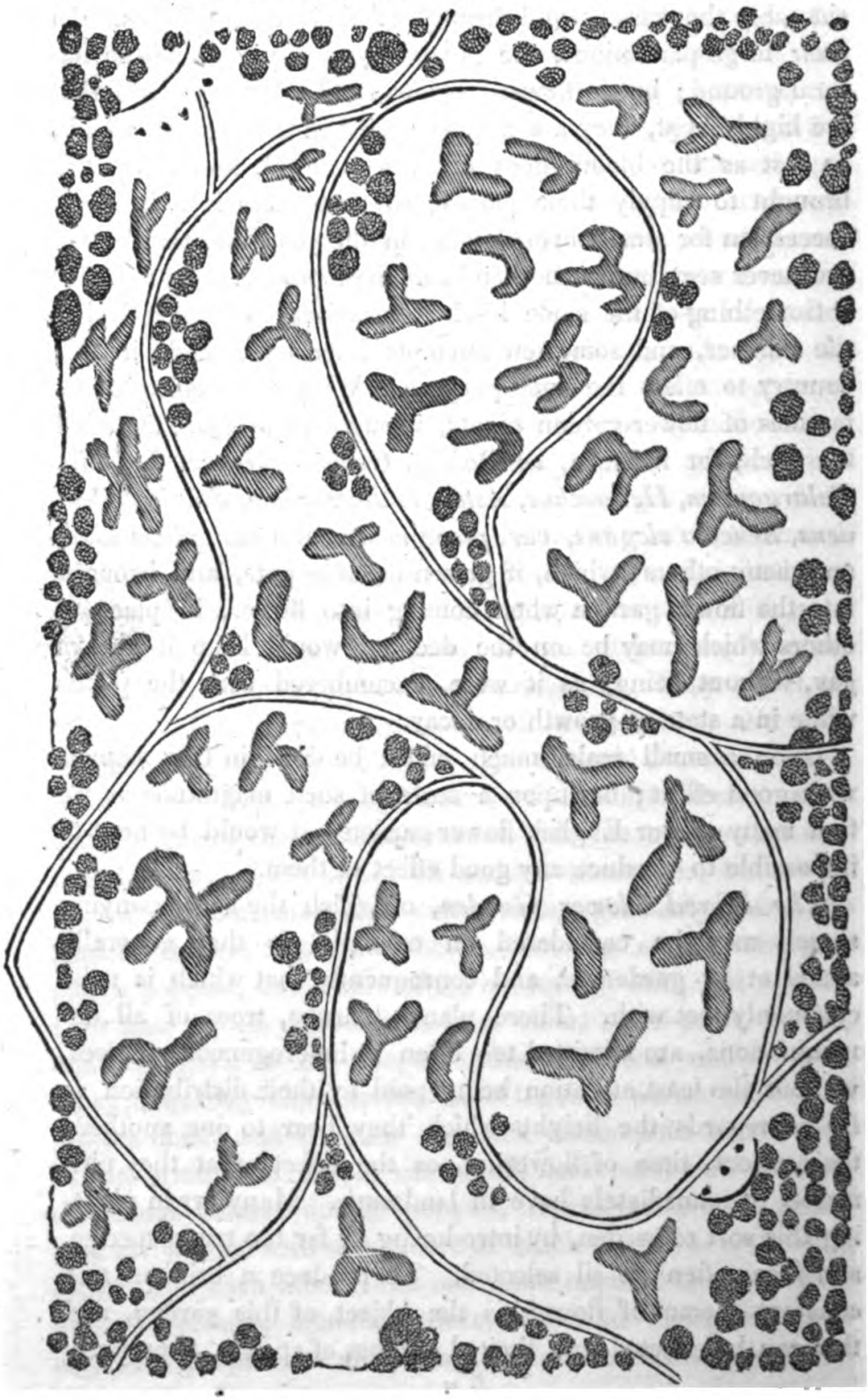
altheas of various sorts, and as many others as they can with any propriety unite. By these mixtures, they increase considerably the variety and beauty of their compositions. In their large plantations, the flowers generally grow in the natural ground; but in flower gardens, and all other parts that are highly kept, they are in pots buried in the ground, which, as fast as the bloom goes off, are removed, and others are brought to supply their places; so that there is a constant succession for almost every month in the year, and the flowers are never seen but in the height of their beauty.

Something of the same kind is practised in France during the summer, and some few attempts have been made in this country to effect the same purpose. With some conspicuous families of flower-garden plants, it ought to be more attended to; such, for instance, as *Dahlia, Chrysanthimum, Lobelia, Pelargonium, Helianthus, Aster, Heliotropium, Salvia Splendens, Senecio elegans, var. pleno rubra,* and *var. pleno alba,* and many others; which, if grown in large pots, and brought into the flower garden when coming into flower, in place of others which may be on the decline, would keep it always gay, without being, as it were, encumbered with the plants while in a state of growth or decay.

Upon a small scale, much might be done in this manner with good effect; but upon a scale of such magnitude as we find many of our English flower gardens, it would be next to impossible to produce any good effect in them.

The Mixed Flower Garden, of which the accompanying sketch may be considered an example, is that generally aimed at by gardeners, and consequently that which is most commonly met with. There plants, shrubs, trees of all denominations, are admitted too often in heterogeneous masses, without the least attention being paid to their distribution as far as regards the heights which they bear to one another; their colors, time of flowering, or the effects that they ultimately or immediately have in landscape. Many err in planting this sort of garden, by introducing by far too many species, and those often are ill selected. To produce a brilliant and constant bloom of flower, is the object of this garden, and that can be effected by a limited number of species, if properly

arranged and selected. A moderate number of select sorts, or what may be properly called good border flowers, and that



number selected equally from the different colours of such plants as are known to flower from February to October, are what ought to demand the exclusive attention of those who would plant a flower garden of this sort. Rarity and variety should not be condemned, but it is always better to have such confined to the botanical flower garden, or in a border either alphabetically or classically arranged; here they will be more immediately under the eye of the cultivator, and less liable to be destroyed or lost. Indeed, in every garden where there is any thing like a collection of plants, some sort of arrangement should be adopted, both as a nursery and an index to point out the exact species of which the collection consists, as well as what species are lost. It is observed by an intelligent writer upon this subject, that flower gardens have been on the decline in this country for the last half century; and the cause assigned is, that the great influx of new plants, during that period, has induced gardeners to be more solicitous about rare and new plants than well-disposed colors and quantity.

Little attention has been practically paid to the disposal of flowers, so as to have the advantage of producing the best possible effect. The authoress of the Florist's Manual, a little work which ought to be in the possession of every young gardener, presents some very just observations upon this subject. "The fashionable novice," she observes, "who has stored her borders from the catalogue of some celebrated name, with variety of rare species; who has procured innumerable rose-trees, chiefly consisting of old and common sorts, brought into notice by the new nomenclature; who has set apart a portion of her ground for American plants, and duly placed them in bog-soil, with their names painted on large-headed pegs, becomes disappointed, when, instead of the brilliant glow of her more humble neighbour's *parterre*, she finds her own distinguished only by paucity of color and fruitless expenditure. Variety of species, bog-plants, and largely-lettered pegs, are all good in their way, but they will not produce a gay flower garden; and the simple cause of the general failure, in this particular, is the solicitude which at present prevails for rarity and variety, in preference to well-blended quantity; as, without the frequent repetition of the same plant, it will be in vain to

attempt a brilliant flower garden, as the art of procuring it consists in the judicious mixture of every common color. Hence, the foundation thus laid, the solicitude of those who wish to complete the superstructure, must not be for rare species, but for new colour, so that the commonest *primula* which presents a fresh shade of red, blue or yellow, &c., ought to be esteemed more valuable than the most rare American plant, which does not bring a single advantage. In the formation of that assemblage of flowers, which may be distinguished by the term of the mingled flower garden, it is essential that the separate parts should in their appearance constitute a whole; and this appearance is not incompatible with any form in which the ground may be thrown, if attention be given to the manner of planting. In some gardens, this appearance of a whole is entirely destroyed by the injudicious taste of setting apart distinct borders for pinks, *hepeticas*, *primulas*, or any other favorite kind of flowers; also for different species of bulbs, as *anemones*, *ranunculuses*, *hyacinths*, &c.: these distinct borders, though beautiful in themselves, break that whole, which should always be presented to the eye by the mingled flower garden, as single beds, containing one species, only form a blank before that species produces its flowers, and a mass of decaying leaves when the glow of their petals is no more. The reverse of this mode of planting is essential to the perfection of the mingled flower garden, in each border of which there should be at least two of every species, but the precise number must be regulated by the force of color displayed by the plant, and the size and the relative position of the borders."

The disposal of the margin, or surrounding plantations, also require much judgment and taste, so that the whole may harmonize with the arrangements within; and while they afford sufficient shelter, they should not be crowded nor yet have a hedge-like appearance. This plantation, if not naturally existing, must be planted; and probably, if partly surrounded naturally, will require some artificial assistance, either to render the shelter sufficient or to improve its appearance. In such cases, the most ornamental trees and shrubs should be placed in front, and in the most conspicuous places; and if

the extent of the flower garden be great, some of the most curious and interesting may be introduced upon the grass, or in the larger of the clumps or groups; and if properly placed, will have a good effect. Attention should also be paid here to dispose of the surrounding trees and shrubs so as to produce a good effect in the coloring even of the foliage, and particularly the habit of the trees. To produce a pleasing effect in planting, the trees should be planted with judgment and with a painter's eye.

The ALPINE or ROCK GARDEN.—Gardeners generally denominate all plants Alpines, that are of very humble growth, and that require some protection during winter, whether they be really natives of Alpine situations or not. To these they add many species that are of difficult cultivation. In considering, therefore, the Alpine or rock garden, we will suppose it to contain all such plants which, from their minute size, rarity, or difficulty of propagation or cultivation, are excluded from the other flower gardens, and look upon it as a garden of vegetable curiosities rather than as one in imitation of rocks and mountains, at which man at the best is but a puny imitator.

In the Alpine garden, a small pond or large cistern should be made for those aquatic plants which are curious or minute, such for instance as *Lobelia Dortmanna*, *Subularia*, *Chara's*, *Pilularia*, and *Isoetes*, &c.; and if the proprietor be of a botanical turn of mind, he may introduce as many species of *Conferva* and *Bissus* as he can cultivate.

A small bog should also be made for the cultivation of many plants, extremely beautiful in themselves, but which require a degree of humidity at their roots not convenient to be applied by any other means; here all the curious species of *Eriophorum*, *Pinguicula*, *Drosera*, &c. may be cultivated.

This beautiful and truly interesting assemblage of plants requires to be viewed closely before their real beauties are discovered, and therefore the nearer they are brought to the eye of the observer, the more readily their beauties are seen. Plants of such humble growth, and liable to so many accidents, are not in many cases fitted for the borders of the

flower garden, neither are they found to succeed well if planted out.

It is seldom attempted to give a natural effect in laying out rock-works, the design of them being generally merely for the better cultivation of plants which grow naturally upon elevated situations, and are liable to be destroyed when mingled with the larger and more hardy species in the flower borders. In choosing the situation for a rock or Alpine garden, it is important that it be exposed to a free circulation of air, and containing, either naturally or artificially, portions fully exposed to the sun, as well as others completely shaded, and if a small rill of clear water can be brought through it, it will add to its advantages. The plants entering into this sort of garden, depend for support more upon a pure air than upon richness or depth of soil. Sometimes situations naturally occur, where objects or situations in themselves uninteresting and even offensive, may with little trouble be brought to become the reverse; such, for instance, as an old stone-quarry, chalk-pit, &c.: these might be converted into rock gardens of more than common interest. Where an imitation at natural rocks is not attempted (and this we would not recommend unless natural circumstances are very favorable, and great taste displayed in the erection,) a rock or Alpine garden may be made very pleasing by merely elevating the borders to a convenient height, and covering them with rude stones, blocks of over-burnt bricks, flints, &c., interspersed with a few specimens of petrifactions, rock crystals, spars, &c., or any curious or interesting specimens of mineral substances that may be most conveniently procured, between which the most curious and rare Alpine plants will succeed, if planted in a stratum of soil congenial to their several natures. In planting rock-plants, some attention ought to be paid to the disposing of them, so that such as *Azalia procumbens*, *Dryas octopelala*, and all the *Helianthemum* family should be as much exposed to the sun as possible; while all plants belonging to *Cryptogamia*, such as ferns, mosses, &c., should be placed in the shade. The soil in which most Alpine plants will succeed is generally of the most primitive nature, such as heath or peat-mould, sand, or

decomposed stone, either micatious or calcareous. A soil composed of half maiden light sandy loam, and half heath or peat earth, will be found to suit nine-tenths of the plants entering into this species of garden. Some few require calcareous matter to grow them in perfection, either chalk or fragments of limestone pounded down, or a portion of lime rubbish, or all mixed with a little light loam, will be as good as any for this purpose.

Others require bog-mould, or entire decayed vegetable matter, to bring them to perfection, such as *Rubus chamæmoris*, *R. articus*, and others, while some seem to exist upon vegetable matter while yet in a state of life; such, for instance, as *Drosera rotundifolia*, *D. longifolia*, &c., which are cultivated, as well as many of the curious plants of the order *Orchideæ*, in masses of moist and living *Sphagnum*. Manure seldom enters into the compositions for growing rock plants; indeed, in general, it is injurious rather than beneficial. A pure, exposed, airy situation, which is kept cool during the excessive heats of summer by the application of plenty of water, copiously given over-head to refresh them, at such times when the sun is off them, and to cool the surrounding air, seems the mode of cultivation most corresponding to their natures. In cultivating a collection of choice Alpine plants, or such as pass under that denomination, it is necessary, for the preservation of each species, that at least one plant or two should be kept in pots; as, when planted out upon the rock, they are in danger of being overrun by their more rambling neighbours, or destroyed by damp in autumn, or excessive cold in winter. To prevent disappointment, and the loss of any valuable species, a collection should be kept in pots, which need not be large; the size known by the name of large sixties will be found sufficient for the greatest portion of them; and a collection so kept has its beauties, when arranged in a neat manner in the rock garden during summer upon a bed formed of finely-sifted coal-ashes, and kept neat and clean; while during winter they ought to be plunged up to the brim almost in the same material, and carefully covered with frames and glasses, so that they may be kept as dry as possible, and frequently examined, to remove all mouldiness, or appearance of damp or decayed leaves. We have cultivated for some years

past extensive collections of these interesting little plants, and found them to succeed to our wishes by adopting the following treatment:—

When the plants begin to vegetate in spring, but not before, they should be examined, and those which are in want of shifting should be separated into two or more pieces, according to the nature of the plant, and each separate piece be potted in a pot of the same size, if it be wished to have the number of the species much increased. Where it is desired to have only a stock sufficient to preserve each species, then instead of potting each piece into which they are divided, we have planted them out on the rock to make up deficiencies; or when they were not wanted for that purpose, we have planted them on the tops of walls, or in other situations agreeing with their respective natures. We do not recommend to shift all the collection at one stated time, all fixed periods for such purposes being radically wrong; plants should only be shifted or repotted when they require it, and not promiscuously, merely because it is spring, summer, or autumn. At a more advanced period of the season they should be gone over again, and divided or propagated, as they require it. When all danger of frost is over in spring, they should be all removed from their winter quarters, and placed on prepared beds of finely-sifted coal-ashes placed closely together. The ground under such covering of ashes should be previously prepared, by being formed of prepared clay, to the depth of a foot or more, and, when finished, a few inches higher at the sides than in the middle, for the purpose of more readily retaining water; for although most Alpine plants require to be kept dry during a great part of the year, still they seem to thrive better when their roots are kept cool, and this is partly attained by keeping the bed upon which they stand rather damp, particularly during the heats of summer. Worms, which are also a great annoyance to all plants in pots, will not so readily reach them, being less fond of living in the strong clay than in richer garden-mould.

Alpine plants, arranged in pots of the same size, and neatly numbered, or their names painted on neat labels, will be rather a pleasing object. Care should be taken in labelling all plants, to adopt labels bearing some proportion to the

plants, the name or number of which they are meant to express. Nothing looks so bad as large, clumsy, badly written, or painted labels; and rather than they should be used, it is better to have none at all. During summer, all that is required in their management, is to supply them with plenty of water, mornings and evenings in dry weather, and to examine them carefully in time of excessive sunshine, to give them a little shade during the hottest part of the day; and every measure calculated to render the air round them cool during summer is desirable. They should be often examined during continued rains; and where it appears that from bad draining, or other causes, the water does not pass readily through the ball and pot, they should be turned over, so that the superfluous water may run out, in which position they may remain until dry enough to be repotted, or they may be placed on the top of the other pots for a like purpose. When worms make their appearance in the pots, it is necessary to turn the ball carefully out, and by that means the worms may be got at and destroyed; or they may be watered over-head with lime-water, which, without injuring the tenderest plant, will bring the worms up to the surface, where they will soon expire. Slugs are more destructive to rare plants in pots than worms, and often eat the heart of the plant out before they can be observed; to keep them under, recourse has been had to lime-watering, &c., but we have always found hand-picking the most effectual remedy in all cases where these destructive creatures intrude themselves.

Care should be observed during summer to collect seeds of the rarer species of Alpine annuals or biennials, or such as are found to propagate by that means only. This is the more necessary, as very many of our rarest plants ripen seeds immediately before their dissolution, thereby affording the cultivator the means of perpetuating, or very probably of rearing a new progeny more likely to be of longer duration with us. The change of climate sensibly affects plants which are natives of high latitudes, or great altitudes above the sea, and it is visible in their continuing only a short time with us in a state of perfection; nor is it in the least improbable, that some perennial plants in their native habitats, become biennials, or

even annuals, when brought into our warmer climate, somewhat analogous to plants which are natives of the plains becoming *Viviparous* when found growing in situations much more elevated. On the approach of the autumnal rains, they should be well cleaned and removed into their winter quarters, but not yet plunged in the coal-ashes, the intention of which is the preservation of the pots from expansion by frost, as well as the preservation of the plants.

For the first few weeks they should be exposed constantly to the air by removing the lights entirely, and only keeping them on during the time of rain; but in winter, however, they need not have much air, provided they be kept free from damp and frost. Alpine plants, although natives of regions of great altitude, many of them growing within the limits of perpetual snow, are often found destroyed by the frost of an English winter; and this proves the necessity of covering them not only with glass lights, but in severe weather with mats, in imitation of the natural covering of snow, by which they are protected and kept warm.

Many plants are almost annually imported from different parts of the globe, which are seldom kept alive above a season or two even by the best cultivators. Of these, the families of *Sarracenia, Ophrys, Habenaria, Corallorrhiza, Orchis,* and several others, furnish examples. Plants of these families require a peculiar mode of culture, with which cultivators are not yet sufficiently acquainted. The most successful cultivators grow them chiefly in decayed vegetable matter and moss, and depend upon keeping them in a close moist atmosphere, considerably shaded. These, however splendid and curious in their mode of flowering, are not often met with in our flower gardens, which arises from a want of knowledge of their proper culture.

In cultivation, the majority of these plants require the constant protection of a frame and glass, and to be kept moist by frequent waterings. The pots in which they are planted should be large, and packed round with moist moss, or plunged into decayed leaves or woody matter very much decayed, so that the roots may never be exposed to the changes of wet and dry; and the pots used for them should be such

as are used for growing bulbs in, as their roots penetrate to a considerable depth. In situations where they can be planted out in shady woods, choosing dry or damper spots for such species as require it, and protected from accidental injury, a great hope exists of their being naturalized into this country; but many of the species cannot be expected to remain long in existence in our flower gardens.

Near to the Alpine garden, if a situation be naturally favorable, a shaded bank should be made for mosses; and blocks of stone, and stumps of old trees scattered about for the growth of fungi. It is only the want of situation, which should be both damp and shaded, and the limited knowledge which exists of these numerous and extremely beautiful and curious plants, that prevent their cultivation. Few plants, if any, in the vegetable kingdom, are so tenacious of life as the majority of the plants forming the great mass of *musci* or mosses. Being for the most part evergreens, and producing their fruit during winter, they will afford a pleasant study to those attached to botanical pursuits, and only require to be seen to be generally admired. Few attempts have been made in this country to cultivate them, and there is little doubt of the success in situations naturally calculated for them. They thrive best in the most barren soil, and almost always in cold and moist situations. Most of them are perennial and evergreen, and their growth is remarkably slow; three, four, and five months often elapse from the first appearance of many of them till they arrive at perfection.

MONTHLY OPERATIONS

OF THE

FLOWER GARDEN.

JANUARY.

PLANTING ORNAMENTAL TREES AND SHRUBS.

At this season, few operations can be carried on in this department, at least as far as regards planting, &c., unless the season be unusually mild, and the soil to be operated upon be of a dry, light texture. Strong wet soils should either be planted early in autumn or late in spring. However, when it is intended to plant, the ground may be prepared, if the weather be dry, and all made ready for planting as the season advances. Should it be temperate, and the soil dry, deciduous shrubs and trees may be planted, taking care to keep them as short time as possible out of the ground, in order that the roots may not be exposed to the cutting winds. Tender shrubs and evergreens of every description, should not be planted now, unless under favorable circumstances, but the former in March or November, and the latter in August and September, and April and May, when it will be found that they will succeed much better. However, where mixed shrubberies are to be planted, the spaces for such may be left until the above seasons. With great care, however, evergreens may be removed, even if of a large size, at any season from April to November, but not so successfully during the winter months. The success of transplanting, in all cases, depends much on the length of time which the plants are out of the ground, as well as on their size, and the nature of the soil in which they grow. In cold situations and strong soils, before planting be attempted, it is necessary that the ground be properly drained and trenched, without which, there can be little

hope of success. Where draining may not be necessary, it is of the greatest importance that trenching should not be omitted, however good the soil may be in other respects. Nothing can be more erroneous in practice, although we see it daily done, than to dig a pit for a tree of only sufficient size for the roots, which are thrust in, and a few clods trodden in upon them; pits made on that principle serve as vessels for holding the superfluous water, that may and will collect in them, and the sides being hard, it cannot readily pass off, but remain to stagnate and sour the mould about the roots, which soon perish. Independently of which, the roots being shortened in the operation of taking up, throw out many fine young fibres, which are intended for collecting the future food of the plant. These fibres, after finding their way through the loose mould with which the pit may be filled, and which may have been prepared for the purpose of more readily causing them to emit young roots, find a barrier in the sides of the pit, through which they are unable to penetrate, and so remain confined within the narrow compass of the pit, until the tree, in all probability, decays for want of nourishment; or, where the pits are small, and the plants large, they are blown about, so that their roots never make any effort to extend themselves, and consequently the tree perishes.

The ground being previously trenched, these objections are remedied; a free filtration goes on, and no part of the ground retains more than its just share of moisture; the roots finding no impediment in extending themselves in all directions.

Much also depends on the state of the ground, at the time of planting, as to whether it be too dry or too wet to ensure success; it can scarcely ever be too dry, and never at this season; and should it be too wet from continued rains or melting snow, it is much better to defer planting until it become of a proper texture. At a time when the soil may be termed neither wet nor dry, the operation of planting will be most successfully performed. It is, therefore, improper to plant in a retentive soil in the time of rain, or even perhaps for some days afterwards, or after a fall of snow, until it has for some days disappeared; whereas, on dry sandy soils it may

be proper to plant in the time of gentle showers immediately after heavy rains, or as soon as the snow has disappeared.

At all times, in preparing the pits for plants, they should be made large, whether the ground has been trenched or not, with the view of admitting the fibres and roots of the plants to be spread out to their full length. Much of the success of planting depends on the spreading out of the roots of the plants in a regular manner, and covering them equally with fine earth, which, if the natural soil be not particularly good, where the trees planted are large or valuable, it will be well to procure some fine mould in which to plant them; or, if the soil be good, some pains should be bestowed to break the mould fine with the spade, and to dispose of it in a regular manner over the roots of the plant; and as the mould is regularly filled in, the plant should be pulled gently up and down, or if large, shaken a little, so as to admit of the mould filling up all the spaces between the roots. The mould should also be gently trodden round it with the foot, and the plant set upright, unless when planting to attain certain purposes, when it may be necessary that some of the trees should not stand perpendicularly.

If the plants be large, they should be carefully supported as they are planted with stakes, to prevent them being blown about by the wind. For want of this precaution many plants are lost, for nothing is more injurious to them than being beaten about and loosened at their roots by the wind. It lacerates and breaks the roots; and the friction of the stem on the surrounding mould forms an opening, which will admit either frost or drought to the roots, both of which are extremely injurious to newly-planted trees.

Newly-planted trees of all sizes, even those that are small, should be gone over occasionally after planting, and those placed upright which may have fallen to a side, and the ground round their roots trodden, and all cracks filled up, so as to prevent the access of drought.

Mulching trees has its advantages, and should be more generally attended to than appears to be the case. By mulching is to be understood a laying on of a covering of littery dung, saw-dust, or any other refuse matter capable of esisting the

effects of drought upon the surface round the roots of newly-planted trees. Gardeners mulch with rich dung, when they wish to convey manure to the roots of trees or plants without disturbing the ground round their roots. Liquid manure answers the same purpose. But in the case of mulching shrubs or ornamental trees, where the intention is to keep the mould round their roots moist, and not to manure them; any refuse matter may be used with equal success.

PRUNING.

Hardy trees and shrubs may be pruned, if the weather be not very severe, but with the more delicate, as well as with all evergreens, the operation should be deferred till March. This is an operation too generally neglected; the consequence of which is, the miserable dead-and-alive specimens of shrubs which we so often see, as well as misshapen trees, which, with a little management, might have been very ornamental. All plants and trees, whether cultivated for their fruits or for the beauty of their flowers, require and should have an annual general pruning or arrangement of their branches, and this pruning should be performed more or less, according to the sort of beauty or effect expected from them. Those which are cultivated chiefly on account of their flowers, should in all cases be pruned upon the same general principles as fruit-trees; that is, all wood should be removed that has a tendency to exhaust or weaken the tree or plant by an unnecessary profusion of leaves and branches. Those which are grown chiefly on account of their foliage, should be less pruned, merely taking away all weak shoots, or part of those that are stronger, where they appear too crowded. Those which are cultivated for the beauty of their natural shape or general outline, require little or no pruning, except it may be the removal of those branches which may have been accidentally injured. Of this description are all those trees which stand singly upon the lawn, grass-plats, &c., and all specimens of trees in the arboratum. No one can expect to have fine shrubberies, nor even fine trees, without the use of the pruning-knife, if for no other purpose than the removal of dead and misplaced spray. In pruning

shrubs, we need scarcely caution the most inexperienced novice against the barbarous use of the hedge-shears. The instruments necessary for this purpose, are pruning-knives, saws, and a neat pruning-hook; and the object to be attained is the removal of all ill-placed branches, either where they cross each other to disfigure the tree, or where they obtrude upon other specimens, or come too close to the walks or flower-plats. In their removal, let it be done as by stealth, so that the amputation will not be discovered. It is often necessary also to thin out the heads of trees and shrubs, for the free admission of air into them, as well as to keep them within their prescribed bounds. Some shrubs require an annual pruning, such as roses, which if cut well in, will break much stronger, and flower better; besides, by this mode of regulating them, they will be kept within reasonable bounds, and always have a healthy and young appearance.

Rambling plants, such as *Lonicera*, *Clematis*, and others, require also a regulation of their branches, by removing all the dead wood, and such of the old as can be spared, as well as shortening some of the young shoots well in, to ensure a succession of young vigorous wood to fill up the spaces they may be intended to cover; without which they would become thin, and unsightly at their bottoms.

GRASS-LAWNS, GRASS AND GRAVEL-WALKS.

Grass-lawns and walks should be regularly attended to in open weather, and frequently rolled, polled, and swept; and where worm-casts are troublesome, let the whole be watered with lime-water, applied by the watering-pot, and repeated till all appearance of them is over. Where leaves or other litter may have been blown upon any part of the grass in the pleasure-ground, it should be removed as extremely injurious to it, and if left long upon it, would destroy it entirely. The grass verges of walks should also be swept, and the roller either drawn over them, or else beaten down, with the turf beater.

If the weather be open and mild, those places which may have been injured, or where the turf is bad, or decaying,

should be made good. Turf may now be laid to any extent in the formation of lawns or grass-walks, taking care that it be laid down as soon as possible after it be cut, and not exposed to frost or drying winds. The ground, previously to having the turf laid upon it, either for walks or lawns, should be levelled, and such places as may have been raised with fresh mould should be trodden or beaten down, to prevent it from sinking afterwards.

When the whole is brought to the desired level, it should be well rolled, if the weather be dry enough to admit of that operation; and if the soil be rich on which it is intended to lay the turf, it would be well to lay an inch and a half, or two inches of any light sandy poor mould upon it, to prevent the too rapid growth of the grass afterwards. Great care ought to be paid to procure turf of the finest quality, that from a sheep-walk or down is always to be preferred, as being naturally composed of grasses of habits the least luxuriant. The turf should be cut in lengths of three feet, and one in breadth, and as near to one inch and a half in thickness as possible, and, as they are cut, they should be neatly rolled up, the grass-side inwards, to render them more portable, and less liable to be broken in the carriage.

Where turf of this description is not to be had, it is better to sow down the ground intended for grass with grass-seeds than to use bad turf. The families *Aira*, *Lolium*, *Festuca*, *Cynosurus*, are to be preferred, with a mixture of *Trifolium repens*, avoiding those of the families of *Dactylis*, *Bromus*, *Triticum*, &c., as of too gross a growth, ever to be brought to a fine bottom. It is to be regretted that so little attention is paid to the cultivation of the useful grasses, both in regard to agriculture and gardening. Previously to laying down lawns or walks, either with turf or artificial grass-seeds, it is necessary to have the ground well cleared of noxious weeds, for if not done before they are formed, it cannot be so well done afterwards. When the turf is laid, it should be well beaten two or three times over with the turf-beater, so as to beat the whole into one mass; afterwards, it should be rolled and otherwise managed according to directions, which will be subsequently given.

PLANTING EDGINGS OF BOX, &c.

If the weather be mild and dry, edgings of box, thrift, &c. may be planted. In preparing the ground for box-edgings, it is necessary that it be well trodden or beaten down, and rendered level with the surface of the intended walk. The line should then be stretched upon it, and with a spade a neat even trench should be made six or eight inches deep, turning the earth out to the side next the walk. Against the side of this trench, which should be rather sloping, the box-plants are placed, and kept steady in their place by pressing the back of the hand against them, while, with the other, the earth thrown out in its formation is placed over the roots and against the plants, which keeps them in their proper place and position.

In preparing the plants for planting, let them be moderately divided, and thinned out in form of a fan, the large and woody roots cut off, as well as the tips of the tops, so that, when the plants are planted, the line will appear straight, level, and equal throughout. Let a sufficient quantity of mould be placed to their roots, and the whole afterwards filled up with gravel, and the walk neatly rolled down.

Edgings of thrift, *Statice armeria*, a native of our sea-coasts and highest mountains, is often planted, and while young, looks neat, but, from its rapid growth and short duration, is not so well calculated for edgings as box; it is readily propagated by dividing the plants into pieces; whether they have fibrous roots or not is of little consequence to their growth: they may be planted as already directed for box, or dibbled in at three inches apart.

PROPAGATING HARDY SHRUBS BY CUTTINGS.

Many hardy deciduous shrubs will now succeed by this mode of propagating. The young shoots of last year's growth should invariably be made choice of, and cut into lengths according to the various sizes and kinds; by autumn they will be fit either to plant out into nursery lines, or some of them may be sufficiently strong to plant out permanently in the shrubberies.

PROPAGATING BY LAYERS.

This mode of propagation, although not to be generally recommended, as the plants mostly originated by it are found to grow to trees less handsome than those which are obtained by seeds or cuttings, is still the most expeditious and sure mode for obtaining rooted plants, and is therefore too often practised by cultivators. There are, however, many rare and valuable plants that are found so difficult to propagate by other means, that it is necessary often to adopt it. For many of those plants, this and the three following months are peculiarly adapted.

PROTECTING TENDER SHRUBS AND PLANTS.

Great care should now be paid to those shrubs and plants which are of themselves not sufficiently hardy to stand our variable, and often inclement winters, without protection. Supposing that, upon the approach of winter, they have been matted up, or otherwise protected by temporary coverings put over them, as well as their roots protected by laying some dry fronds of fern, straw, or saw-dust over their roots; in fine days the covering which is over their branches should be removed, to allow them to enjoy as much light and air as possible, and such covering should only be again applied on the appearance of severe frosts. Such shrubs and herbaceous plants, as may have been planted in autumn, should be also protected at their roots by spreading litter, fern, or straw over the surface, to prevent the admission of frost, which to them would be extremely injurious, and to many even fatal.

ALPINE AND RARE PLANTS REQUIRING PROTECTION.

The Alpine plants in pots, in frames or pits, or those which are rare and require such protection, should be daily looked over, and all appearance of damp removed. The glasses should be kept constantly on them, unless in fine days, when they may be partially removed. Such plants, while in an

inactive state, will not hurt from being confined under cover, provided they be kept dry; as, in their native habitats, they are covered with snow for several months annually.

FLORISTS' FLOWERS.

Under this head we comprehend tulips, pinks, carnations, auriculas, polyanthuses, anemonies, ranunculuses, hyacinths, &c. The tulip-beds, planted in autumn, should be protected from much wet, as well as from severe frosts; both of which would be very injurious to them. Those pinks and carnations, which are in pots or beds, should also be attended to, and all decayed leaves removed, and the beds protected from too much wet by occasional coverings of canvas or reed-mats, which can be readily applied by having the beds hooped over in a neat and secure manner. Those which are in pots should be protected by being plunged in coal-ashes, or saw-dust, up to their rims, or removed under cover of frames and glasses. Auriculas and polyanthuses require at this time to be also protected from severe cold and heavy rains. It is of material consequence that both, particularly the former, be kept dry, and placed in an airy situation, for, if placed in one which is wet, they are liable to damp off.

PLANTING ANEMONIES, RANUNCULUSES, &c.

Such of these as were not planted in autumn may be now planted, if the ground be dry, and the weather mild; but it is only in very light soils that they will succeed at this time, the proper time of planting being October and November, and in wet heavy soils in February and March: the latter planting will prolong the season of flowering.

PLANTING BULBS.

Various bulbs, such as hyacinths, jonquils, prancratiums, narcissuses, frittillaries, crown imperials, &c., may still be planted in light dry soils, if not planted in October and November; but, in heavy wet soils, it is better to defer planting

till the end of February or March. Crocuses and snow-drops may also be planted, either in beds, arranging the colours, so as to produce effect, if in beds, or they may be planted for temporary edgings, or in patches, of ten or twelve roots each, by the sides of the walks, or under the shade of trees and shrubs, where almost nothing else would grow. The more common kinds of narcissuses, crocuses, and snow-drops, together with Winter Aconite, *Eranthis hyemalis*, *Helleborus nigra*, *H. lividus*, and *H. atro-rubens*, will give relief to the gloom and dead appearance of the grove in winter, and give rise to pleasing associations in the shrubbery. These may be now planted, and if once introduced into the shaded parts of the pleasure-ground, will not readily be lost.

FORCING FLOWERS.

Many flowers may be brought to perfection for the drawing-room, &c., with little trouble or expence at this early part of the season, either forced in pits, or placed in any of the forcing-houses now at work. For this purpose, it is necessary to have a stock potted, or reared in pots in autumn, and protected during winter until such time as they may be wanted. The sorts most generally chosen for this purpose are Cape Jasmine *Gardenia florida*, *G. radicans*, carnations, mignionette, double-flowering peach, double-flowering cherry, pinks, double rockets, violets, *Viola odorata var. pallido plena*, &c.; wall-flower *Cheiranthus Cheiri flora pleno*, &c.; roses of sorts, *Amaryllis* of sorts, hyacinths, Persian and common lilac, narcissus of sorts, *Heliotropium peruvianum*, and many others which are found to perfect their flowers from this time until they expand in the open air.

Many bulbous plants may be flowered to great perfection, particularly hyacinths, narcissuses, and tulips, by placing them upon bulb-glasses, which glasses should be filled with soft-water, and the bulb so placed that their bottoms only should touch the water. These, if placed in any of the forcing-houses at work, or other warm situation, will readily come into bloom. They will soon shoot their roots into the water, which should be changed for them every day.

FEBRUARY.

PLANTING DECIDUOUS SHRUBS AND TREES.

The planting of all deciduous shrubs and trees on light soils should now be finished as fast as possible. But, on soils of a colder nature, they may be planted during the following six weeks with success. Where it is intended to plant largely, it will be well in either case to have all such as are intended to be planted taken up, and laid in by the heels, as it is technically called, so that vegetation may be checked or retarded until it be possible to have them planted. Evergreens should not be planted at this time, unless for particular reasons, as they are found to succeed much better when planted either in August or April, and the beginning of May. However, with care, these may be planted at this time where particularly wanted. At this season it is material that they be kept out of the ground but as short a time as possible, and that their roots be not exposed to frost or to cold cutting winds.

PRUNING SHRUBS AND TREES.

Let the pruning of all shrubs and trees be now finished as soon as possible, that the borders and grounds may be dug or otherwise put in order for the season; and, in performing this operation, it is necessary, in the first place, to cut out all dead or decaying wood, or spray, and to shorten in all the shoots which may have been injured, or not sufficiently ripened, to their extremities. Those shrubs which are naturally disposed to grow bushy or crowded, should be thinned out particularly towards their centre, that the air may more readily circulate among the remaining branches. Roses should be headed down, leaving only a few inches of the last year's wood, which will make them break stronger, and flower more abundantly; besides, hard pruning keeps them neat and within proper bounds, without which they would soon become un-

sightly. Honeysuckles, and such rambling growing shrubs, require also to be well shortened in, unless where they are intended to cover walls or disagreeable objects. In the flower garden and shrubbery, where a dense mass of vegetation is not particularly wanted to hide certain objects, or for the sake of shelter, each shrub should stand detached, and of itself form an agreeable outline. Ornamental trees require little or no pruning, as it is intended to see them assume their natural characters; but those branches which may have been broken or injured during the winter, or those which cross each other in a crowded manner, may be safely removed.

All suckers rising from the bottoms of shrubs should be either destroyed, or, if wanted for propagation, should be removed and planted out to nurse until they be strong enough to be planted out where they are to remain.

DIGGING THE SHRUBBERY AND FLOWER BORDERS.

When the weather is dry, the shrubbery should be dug over in a neat manner, which will greatly encourage the growth of the shrubs, as well as give the whole a more agreeable appearance, and render it much easier to keep it in neat order during the summer by the hoe and rake. It is never necessary to give manure to shrubs; but when the roots of them become so matted and entangled, as to render digging amongst them impracticable, it may be necessary to top dress them with any light mould which is free of weeds; this will greatly encourage their growth, as well as give the borders a neater appearance. In very old shrubberies, digging is unnecessary; all that is required is merely to keep them clear of weeds and decayed leaves, by means of the hoe and rake.

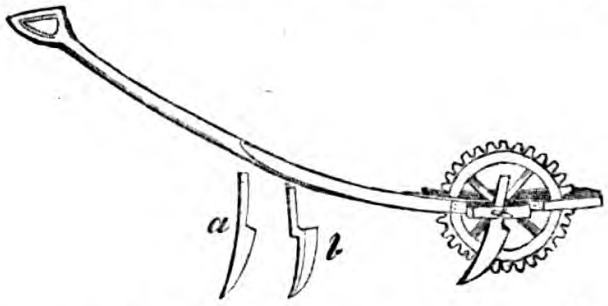
The flower-borders are differently constituted, as they are never allowed, under good management, to become impenetrable to the spade. They require an annual digging, and that must be even carefully performed, for fear of injuring the plants which are under ground, or burying those that are small.

To obviate this, in a great measure, each plant should be furnished with a label, upon which its name should be neatly

printed or written, or numbered, so as to refer to its name in a list. Many, however, object to plants being labeled, as having an appearance not altogether in character with the private flower garden, and where that is the case, stout pegs may be driven into the ground close to each plant, and their tops level with the surface; this will, in a great measure, protect the plants, while the cause is kept concealed. Great care should be taken in putting in the spade that the plants be not injured, and for the better effecting this purpose, a neat three-pronged fork might be used instead of the spade, which will perform the necessary operation without endangering the plants.

GRASS-WALKS AND LAWNS.

Grass-walks and lawns may still be continued to be laid or sown where required. Continue to sweep, poll, and roll grass-walks and lawns, when the weather will permit. The grass-edgings or verges to gravel-walks, and the sides of all grass-walks, as well as the edges round clumps of shrubs or flowers, should be now neatly gone over with the edging iron, and cut as straight as possible. The accompanying figure represents an edging-iron of our invention, which was first published in



the *Gardeners' Magazine*, No. 2, by our permission, and may be purchased of Mr. Ware, at his Agricultural Machine Warehouse, Oxford-Street, price *One Guinea*. In all cases, excepting when there is a long straight line to be edged, a garden-line is unnecessary; where a line must be used, it will perhaps be best to place it so that it will run between the wheel and the coulter, or cutting-part of the machine (*a*); a certain degree of pressure is necessary upon the handle, where

the ground is hard; and the knee'd coulter (*b*) may be used where the edgings are not very regular.

The expedition and accuracy with which a labourer, once accustomed to use it, will go over a piece of ground, is surprising. As the grass will now be beginning to grow, it is necessary to have it cleared of all leaves, or other matter that may have accumulated during the winter, and to be put in neat order for the season.

BOX OR OTHER EDGINGS.

Edgings of box, thrift, &c., may now be planted, or any vacancies in those already planted may be made up. *(See last Month.)*

GRAVEL WALKS.

Keep the gravel-walks free from weeds, moss, and litter of every sort, and let them be often weeded, hoed, raked, and rolled, in dry weather.

SOWING TENDER ANNUAL SEEDS.

Towards the middle of the month prepare a hot-bed of moderate dimensions, on which to sow all kinds of tender annuals, either in large pots plunged in the dung, each having a different sort, or where the number of each may not be required to be so great, two sorts may be sown in one pot, and when sown, each should be correctly labeled; or, if the number required be great, the bed being moulded over, small shallow drills may be made across it for their reception. As some of these seeds are very small, they should not be buried too deep, and the mould in which they are sown should be of a very light and rich nature; that of vegetable mould of decayed tree-leaves should be preferred.

When the plants appear, admit air every day, more or less, according to the weather, and let them be supplied with occasional waterings from a fine rose watering-pot, having the water aired previously to using it. Where only a few of these seeds are to be sown, they may be sown in pots, and

placed in any of the hot-houses now at work, or at the back of any melon or cucumber-frames. When sufficiently strong, they are to be pricked out into small pots, and afterwards encouraged in growth, so that they may attain a larger size before flowering.

SOWING HALF-HARDY ANNUALS.

Half-hardy annuals are such as require to be reared on a slight hot-bed, towards forwarding them for their final plantation in the open borders of the flower garden. They may be sown every way as already directed for tender annuals, but are always sown in greater quantity. When the seeds vegetate, air should be freely admitted, and during fine days the glass may be entirely removed from them, taking care to cover them up at night. If the plants come up too thick, they should be thinned out, so that they may not be injurious to each other.

SOWING HARDY ANNUALS.

Towards the middle or latter end of this month, if the weather be mild, and the ground dry, and of a light and sandy nature, hardy annuals of all sorts may be sown either in beds to be again transplanted, or into the borders, where they are to flower, in patches moderately thin, and not deeply covered. The smaller growing annuals do not succeed so well by being transplanted as those of stronger growth, therefore the former should always be sown in patches, where they are to remain to flower. In sowing them, the ground being previously dug, patches should be stirred up with a small trowel, about a foot broad, breaking the earth well; a small drill should then be drawn in a circle of nine or ten inches diameter, and half an inch deep, into which the seeds should be regularly sown, not too thick, and neatly covered over. As each patch is sown, it is necessary to place a small label in the centre of the circle, with the name of the plant sown, in order to prevent, in future sowings, too many of the same kinds, or too many of the same colours being together, as well as a mark to prevent them from being destroyed in the ope-

ration of hoeing and raking the borders. When the plants have come up an inch or two, they will require to be thinned, particularly the larger growing kinds, to admit of their attaining a good size.

Where the soil is strong and wet, the patches may be formed for the reception of the seeds by placing in each a spadeful or two of fine light sandy mould into which the seeds may be sown.

SOWING PERENNIAL FLOWER SEEDS.

Seeds of hardy perennial flowers may now be sown on a moderate slight hot-bed, in rich light mould, as already directed for annuals. When the plants appear above ground, give air daily and freely, to prevent them being drawn up weak, also let them be moderately thinned out, so that they may attain some strength by the time that the weather will admit of their being pricked out into nursery-beds.

SOWING BIENNIAL FLOWER SEEDS.

Seeds of hardy biennial flowers, may also now be sown either on a slight hot-bed or on a warm border, in light rich soil. The directions already given for perennials are also applicable to these.

PLANTING HERBACEOUS PLANTS.

Herbaceous plants of all sorts may now be planted, if the weather be mild. In planting such, much judgment is necessary, to dispose of the whole so as to produce an agreeable effect when in flower, as well as to arrange them, by which there will be an uninterrupted succession of flower during the season.

FLORISTS' FLOWERS.

The fine auriculas in pots should be gone over; all decayed leaves removed, and the surfaces of the pots gently loosened up, and a little fresh mould applied all over the surface and round the stems. This will support them, and enable them to

bring their flowers to greater perfection. Those which require it, should be shifted into larger pots in a careful manner. All suckers should be removed from the stems and potted, or otherwise disposed of. Water should be now given to them in moderate and regular supplies, and plenty of air admitted to them, if in frames, during the day; but care must be taken to prevent them from exposure to frosts during the night, to prevent the opening blossom from being nipped or injured.

Tulips and hyacinths in beds should be protected from severe frosts and rain, by being covered with canvas or mats supported upon hoops arched over them; for as the flower-buds will now be beginning to come through the ground, they are in that state more liable to be destroyed. It is, however, unnecessary to protect the less valuable sorts, otherwise than merely by spreading a little dry litter over them in severe weather, but the more choice ones should be carefully protected from continued rains, snow, or severe frost.

Carnations and pinks should be often looked over, and all dead leaves picked off, and every thing removed which tends to produce damp or decay. Those which are in pots should also be attended to, and a watchful eye kept that they do not sustain any injury from slugs or mice, both of which, at this season, are often destructive to them.

SOWING SEEDS OF AURICULAS AND POLYANTHUSES.

Auricula and polyanthus seeds should be now sown either in a warm sheltered spot, or in shallow boxes or pots filled with light rich mould. Boxes and pots are to be preferred, as being more readily removed from one situation to another, as occasion may require. The surface should be made perfectly smooth and level, on which the seeds should be sown tolerably thick, and covered about a quarter of an inch with very light finely-sifted mould. Previously to filling the boxes or pots, it is important that they be well drained at bottom, to allow of all superfluous moisture passing freely off. When sown, they should be placed in a situation perfectly sheltered from the cold winds, but entirely open to the morning and mid-day sun. In this situation they may remain till the be-

ginning of May, when it will be necessary to remove them to some more shaded place. There is not any plant which attracts the florist's attention, that requires more shade than the polyanthus.

TRANSPLANTING CARNATIONS AND PINKS.

In mild weather, transplant those carnation plants, which have been last year propagated from layers, into beds in the flower garden, or into pots, to be afterwards shifted into larger ones as they advance, in the latter of which they should be left to flower; or they may be planted out singly, or in patches, of three plants in each patch, promiscuously through the flower garden or edges of the shrubbery.

Pinks propagated last year should now be also planted out, either in beds in the flower garden, or in patches in different parts of it.

FLOWER GARDEN BORDERS.

Let the flower garden borders or beds be now thoroughly cleared of all weeds, and every kind of litter; for neatness in this department is expected, and always agreeable, and at no season more so than at the present, when the flowers and plants are beginning to appear. The surface of the borders should be neatly and carefully stirred with a hoe, and neatly raked, which will give a liveliness to the surface, and make the whole appear pleasing to the eye.

ALPINE AND OTHER RARE PLANTS IN POTS.

At this season, many of the Alpine, and other rare plants in pots, will now be beginning to show evident signs of vegetation. It is necessary, therefore, that they be carefully examined, and that it be ascertained which of them are dead, that they may be by some means or other made up again. Those which it is desirous to propagate, should now be taken out of their pots, and divided into pieces, according to their several habits, and repotted; and others that may have increased beyond the intended limits of this collection, should be planted out, partly on the rock, or in favorable situations

in the flower borders; keeping only a specimen or two of each in pots, unless it be those which are very minute and liable to be lost, or too rare to be yet trusted out either in the general collection or in the flower borders. Many Alpine plants of great beauty are only annuals, therefore such should be attended to, and the pots in which they grew left undisturbed, as in a short time, it is very probable that a stock of young ones will arise out of them, which is particularly the case with the families *Cochlearia, Illecebrum, Draba,* &c. Many other families, of which it is necessary to keep duplicates in pots, such as *Dianthus,* and some others, require to be propagated annually either by cuttings or seeds; with such exceptions, the remainder should be annually repotted and divided, and no season is so fit as the present. As they are repotted, they should be replaced in the frames or pits, and protected from heavy rains until they have taken fresh root, after which time the majority of them will be fit to be placed in their summer station, which should always be one that is shaded by walls or pales, but not by any means by trees, unless the plants can be placed sufficiently distant from them to be out of danger of being injured by their dropping.

Seeds of Alpine plants may be sown at this time with every chance of success; and as they are small, they should be sown in finely-sifted mould in pots, and kept in a cool frame, considerably shaded, and regularly supplied with water. In sowing the seeds, they should be scattered rather thin on the mould, to afford them room when they vegetate, so that they may be left to attain a considerable size before removed to single pots, as they are very apt to damp off when potted while too small.

MARCH.

PLANTING SHRUBS AND ORNAMENTAL TREES.

The planting of all deciduous shrubs and ornamental trees should now be finished as soon as possible, as many of the forward kinds will be beginning to vegetate. In planting in light soils, the roots of trees should be well covered with mud previously to being planted, or, as gardeners term it, mudded in, or well watered immediately afterwards; and those which are of large size should be supported in a neat and secure manner with stakes, to prevent their being blown about by the winds. Evergreens of the Pinus, and such like hardy families, may be successfully planted now, but for those evergreens which are of a more delicate nature, the next month is more suitable, particularly if in exposed situations. In shaded or sheltered situations, they may be, with care, planted almost at any day of the year with success; but on a large scale, and where they are not completely sheltered, April and May will be found the better season for spring planting, and August and September for the autumnal.

Where roses are to be planted, either in the borders singly, or in collections, this is a good time for that operation. When planted in the borders, they should occupy the front, or side nearest to the point from which they are to be seen; as the best cultivators of this flower, by training and pruning, keep them within a few inches of the ground, unless for particular purposes, they may be occasionally allowed to grow to a greater height.

Few flowering shrubs require a better soil to produce their flowers in perfection than the rose, although in their wild state most of them are found in sandy poor soils, yet, when cultivated, they can hardly be planted in soils too rich or strong.

Roses planted in collections by themselves, are very interesting; and, in an extensive place, it cannot be considered as

complete without such a collection. To produce the greatest, and probably the most imposing effect, this numerous family should form the furniture as it were of an entire garden. Such gardens have been denominated *rosaries*, and are variously formed, according to the extent of the collection and taste of the planter or owner. In the arrangement of the sorts, they should be so placed, that the varieties which resemble each other may be placed together, in order that their distinctions may be the more readily seen, and only one plant of each variety introduced. The different varieties of China roses should be placed by themselves, that they may be the more readily protected during winter, as many of the finer varieties are not sufficiently hardy to stand our severest winters. That numerous assemblage of roses, denominated Scotch, from their habit of growth are better calculated for covering banks or rock-work, than blending in a general arrangement of this family; they should, therefore, also be planted in a separate compartment by themselves, either as a centre or margin for the whole.

Of this interesting section of this genus, there are above three hundred varieties to be procured in the nursery of Messrs. Austin of Glasgow, who probably have the finest collection in the kingdom. The catalogues of roses in the London nurseries enumerate upwards of five hundred names; and the catalogue of Calvert & Co., near Rouen, exceeds nine hundred: the greater part of these being raised within these thirty years from seeds saved on the continent, where these seeds ripen more frequently than with us. French roses are imported annually by us in large quantities, and are in a great part budded upon stems of stronger growing kinds, from two to ten feet high.

In planting rosaries, those which are considered English roses, or such French ones as are hardy enough to stand our climate without injury, should be planted and trained, by laying annually the branches to within a few inches of the ground, and so managed that the whole surface may be covered with them. The more delicate French roses may be planted as standards amongst the others, and will in such an arrangement have a

good effect; or they may be planted out on the lawn singly, or in lines by the sides of walks.

GRASS WALKS AND LAWNS.

Where grass lawns are to be made of any considerable extent, this is now a good season, and the mode of forming them by sowing is decidedly the most expeditious and economical. In preparing the ground for this purpose, it is necessary to be at some pains in having it thoroughly cleared of root-weeds, which if not done now, cannot be accomplished afterwards without evident injury to the grass. For this purpose, the ground should be carefully dug over and all such roots picked out; it should then be properly levelled and rolled down to a regular and uniform consistency. If the ground be rich, which is thus intended to be laid down, the grasses would be apt to grow too luxuriantly, and be not only difficult to keep, but would also never become of a fine bottom. A thin stratum of sand or light sandy earth should be regularly spread over the whole, as noticed last month; over this a thin stratum of earth of a richer texture should be placed in an even manner, into which the seeds should be regularly sown, and when raked in, be well rolled with a heavy roller. As the spring advances, the new sown lawn should be frequently examined and cleared of all weeds as they appear, and if the grass-seeds have failed, or come up too thin in some places, more seed should be sown as soon as such failures are discovered. Such lawns should be cut several times during the first season, but never too close nor yet in dry weather, as, in that case, the roots would be liable to be parched up by the drought.

Where immediate effect is the object, and where good turf can be procured, the most eligible plan is to cover the whole with turf cut from some down or sheep-walk, where the herbage is fine, as, in a few weeks, the whole may appear as if it had been made for years. This is as a good season for this operation as any, indeed, from September till the beginning of May, provided the operation be performed neither in too dry nor too frosty weather. Such as is laid late in spring should be occasionally supplied with water, until the turf has taken root, if

the season be not unusually wet. The ground, previously to the turf being laid down, should be properly levelled, and if too rich, a thin stratum of fine sand, or light sandy barren mould, should be placed all over it, as already directed. As it is laid down, let it be well beaten with the turf-beater, and, when tolerably dry, repeatedly rolled. During the first season after laying, it should not be too frequently, nor yet too closely cut, as it will be less able to resist the effects of dry weather.

Grass walks are not so frequently met with now as formerly, neither should they be introduced where good gravel can be had, particularly where there is to be much traffic, as they are less calculated to last long in good condition. However, it sometimes occurs that such walks are not to be dispensed with, and, in such cases, they should be formed at once of turf, and not sown down with seeds; and the tougher the turf is, the better they will resist the action of the feet.

GRAVEL WALKS.

Gravel walks should now be put in good order for the season. Where the gravel is still clean and good, they should be rolled once or twice a week, so that the surface may be kept smooth and agreeable to walk upon. Those walks which have been made a long time, and are become dirty upon the surface, as well as those which are liable to be overrun with different species of mosses and other weeds, should be turned; that is, they should be dug over with a spade to the depth of two, three, or four inches, turning that which was the surface into the bottom, and bringing up from that depth a fresh surface; by this means the walks will appear as if they were newly made. Where gravel walks have been washed away during the winter, in a season of heavy rains, or have fallen into holes or inequalities of surface, or which are otherwise out of proper repair, they should be top-dressed with a thin coat of clean good gravel, and well rolled down.

In forming new gravel walks it is important that they be rendered perfectly dry at bottom, by having a formation of from one to two feet of brick-bats, flints, small stones, or such like matter, over which the gravel is to be placed. Such pre-

paration is necessary in all situations, however dry; but in wet ones it will also be necessary, in order to render them still more dry, to have a drain in the middle of each, below the stratum of flint, stones, &c., which drains should empty themselves at convenient distances, in such a way as the water which they may collect may be carried off to a distance, or disposed of so that it may not be injurious to any part of the garden.

Those gravel walks which may have been ridged up in autumn should now be levelled down, and put in order for the season. We have advised this mode of ridging up the gravel for the walks in the Culinary Garden, for the greater preservation of them during winter, when the gravel would be liable to be injured by wheeling, and such like operations that might require to be done in that department; but as there will be fewer of these operations going on in the flower garden or pleasure ground; and as the walks, while in such a state, would be unsightly, and rendered unfit for use, we would not advise that operation to be performed in this instance. Indeed, the walks throughout the flower garden and pleasure ground should be kept equally well during the winter as during the summer. As the gravel is turned over, or fresh gravel added, it should be rolled as the process goes on, for gravel seldom binds so well after rolling, if that operation be deferred until it becomes either dry or exposed to rain.

DIGGING THE FLOWER BORDERS AND SHRUBBERY.

Every part of the flower garden and shrubbery should now be put into the best order. The flower borders and shrubberies should be finished digging if deferred so long. Previously to digging or pointing over these borders, all edgings, whether box or turf, should be neatly and evenly cut, the former with the box-edging shears, and the latter with the edging-iron. Those borders which have been dug over in autumn, or during the winter, should be frequently hoed and raked over to give the whole a more cheerful and respectable appearance.

PLANTING BOX AND OTHER EDGINGS.

Box and other edgings may be now planted or repaired when the weather is fine; if dry, give occasional waterings until they have struck root.

PLANTING HERBACEOUS PLANTS.

All sorts of herbaceous plants may now be planted, either to fill up vacancies in the flower borders already planted, or to plant such as are in process of making. More attention should be paid to the arrangement of these plants, as far as regards colors, than seems to have been hitherto practised, as well as the keeping up a succession of these flowers for the greatest possible length of time. The beauty of a border of gay flowers does not consist so much in the quantity of bloom as in the manner in which that bloom is disposed of, so that harmony of coloring may prevail throughout the whole.

SOWING TENDER ANNUALS.

If these were not sown as directed last month, let them now be sown without delay, either in large pots plunged in a mild bottom heat, or in drills in fine rich light mould, as directed last month. Plants now raised from seed will bloom beautifully in June, July, &c., till the end of the season, and will come in very useful for decorating the green-house when the plants are out in their summer station, as well as the conservatory and drawing-room, during these months.

PRICKING OUT TENDER ANNUALS.

Such tender annuals as were sown last month, and are now fit for being removed into nursing pots, should be attended to. Make choice of the strongest plants, which should be taken up carefully out of the pots into which they have been sown, and pricked off into small pots, one plant into each, if of the size called *Thumbs* or *Thimble* pots; or three plants may be placed into each, if in such as are of the size of small *sixties*, these to

be afterwards transplanted into larger pots as they advance in growth. To have these plants fine, it is necessary that they be grown rapidly, and great care must be taken that they do not receive a check in their growth, which would be apt to throw them into flower at a premature state, when their flowers would not attain so large a size, nor yet blow so fine. Throughout the whole culture of tender annuals, they should be prevented from being drawn up slender, which will be the case if kept too far from the glass; for this purpose nothing is so well adapted for their reception, after their being once potted-off, as a hot-bed frame of the ordinary dimensions, so that the plants may be allowed to enjoy plenty of light, and be near the glass, while their roots are plunged into a mild bottom heat. While in this bed they should be regularly supplied with water, and often sprinkled over their leaves, and air daily admitted to them.

SOWING HALF-HARDY ANNUALS.

Half-hardy annuals comprehend all such as require to be forwarded in a mild heat, and gradually hardened till they are sufficiently established, and the season mild enough to admit of them being planted out in the borders of the flower garden, either in large patches by themselves, or singly amongst the other plants. To this division of annuals belong by far the most splendid and curious; and as they can be cultivated in the open air during summer, after having attained a certain size, a large portion of each seed should be sown when compared with those under the last head.

SOWING HARDY ANNUALS.

Hardy annuals of all sorts may now be sown in the open borders, where they are to remain to flower. In sowing these, the dwarf ones, such as *Convolvulus minor*, *Anagallis Indicæ*, *Mignionette*, &c., should be sown in front of the border, while the various varieties of lupins, larkspurs, &c., occupy the middle, and sweet peas, sun-flowers, and such as are equally tall, should be placed nearest the back, that is, the farthest from the walk. They should be sown, each kind separate, in patches of ten or

twelve inches in diameter; and some kinds, such as mignionette, may be sown in larger patches, while sweet peas may be sown in lines to hide disagreeable objects, for which they are admirably calculated; and by being neatly staked up, will have a showy and gay appearance.

In order to fill up vacancies, as well as to plant in such places that may at present be filled with bulbs or other spring flowers, a considerable sowing of hardy annuals should be made in the reserve garden (a very necessary appendage to every flower garden), from which a supply can be taken when wanted to plant in the borders; and as many of these plants are improved by being transplanted, such as lupins, sun-flowers, and other strong growing kinds, they will be rather improved by this mode of culture than otherwise. A sowing of many of these sorts should be made towards the end of this month, and another in April, for the purpose of rearing plants to come in, in succession, and to last till destroyed by the autumnal frosts.

TRANSPLANTING ANNUALS SOWN IN AUTUMN.

Many annuals sown in autumn are found, with a little protection to withstand the winter, and when that is the case they come into flower much earlier in spring, than such as are sown even upon a hot bed, and they also flower much finer. Of these, that beautiful plant *Coreopsis tinctoria* is a striking example, although only introduced a very few years from its native wilds in the Arkansa territory, in North America; it is now become very common in our gardens.

Plants self-sown in autumn, and either potted off into small pots and protected in a dry airy frame during the winter, or pricked out into shallow boxes under the same protection, will be in good order at this time for finally planting out in the flower borders, where they will attain the height of four or five feet, and be covered with flowers from the ground upwards. Mignionette, by the same mode of culture, will also be found to succeed well, and will come into flower long before that which was sown in spring.

SOWING HARDY PERENNIAL AND BIENNIAL FLOWER SEEDS.

All kinds of hardy perennial and biennial flower seeds may be sown towards the middle or end of this month. As these plants do not flower the same season in which their seeds are sown, it is therefore unnecessary, at this time, to prepare a hot-bed for them; the proper situation for them being the reserve garden, where a piece of rich light ground should be got ready for their reception by being well dug, and divided into beds according to the number and quantity intended to be sown. The ground being prepared, the seeds of each sort should be sown thinly and regularly, either in beds or in drills; and as they are sown, let them be covered to the depth of half an inch and correctly labeled.

ALPINE AND OTHER RARE PLANTS IN POTS.

The potting of the Alpine, and other rare plants, in pots or frames, should now be finished; and after they are again sufficiently established in the pots, they should be placed out in their summer station. There are, however, many which will require the shade and close air of the frame or pit during summer, both for shelter and shade, particularly the latter; of these are most of the natural order *Orchideæ*, many *Ferns*, and some other families, such as *Sarracenia, Drosera*, &c.; these should be kept in a close frame during the summer, plunged in a thick mass of sphagnum or other mosses, and kept damp by often watering them over head with a moderately fine rose watering pot. By far the greater portion of Alpine plants will succeed well in pots of the sizes called large sixties or small and large forty-eights, in a soil composed of one half of light sandy loam, and half bog or peat mould, occasionally using a little fine white sand or mould of decomposed leaves. During the summer they should be placed in a situation as little exposed to the sun as possible, but not by any means under the drip of trees, on a bed prepared for them of finely-sifted coal ashes, as already noticed. As the great object of a shaded situation is to give them the advantage of a cool and equitable atmosphere; this will be increased by frequent watering over head

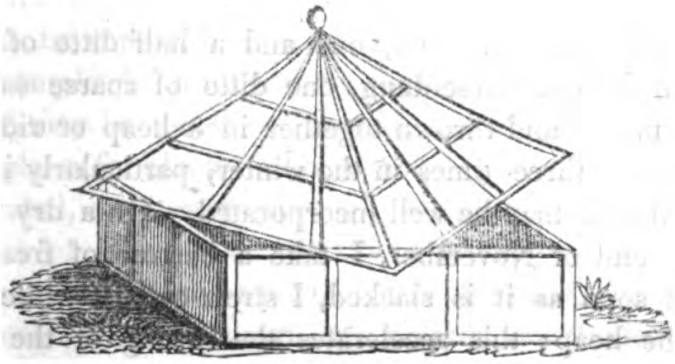
with a fine rose watering-pot; but this can only be done with safety, either early in the morning or late in the afternoon. When such a practice renders the mould in the pots too damp, (a thing to be guarded against in spring and autumn, but during the warm months of summer, evaporation will go on so rapidly, and the plants being in small pots exposed all round to the action of air, will not be injured by it,) water may then be given amongst the pots, so as to keep the bed on which they stand always cool and rather damp. By a similar practice we have been enabled to cultivate Alpine plants on an extensive scale, and the result has been entirely to our satisfaction.

Alpine plants are often planted out on rock-works and in shaded borders. Professor Thouin arranged a bank of Alpines in the Paris garden, an account of which he published in the *Annales de Musée*, and a translation of which has been published by a celebrated English botanist in the Trans. Hort. Soc. The plants on this bank did not succeed to expectation; and daily experience shows that plants of this description never thrive well, nor long, in beds or banks of any kind. The practice of potting appears, therefore, to be the best mode; and although attended with a little more trouble and expence, the lovers of these curious and interesting portions of the vegetable creation will be repaid by having many of Nature's smallest, and not less perfect treasures, in a state of perfection equal to their native habitats.

FLORISTS' FLOWERS.

Auriculas.—The auriculas, in pots, should now be gone over, and all decayed leaves removed; the surface of the mould in the pots loosened and partly removed, and a top-dressing of fresh mould given them. They should, if in a frame or auricula stage, be frequently, although moderately supplied with water and exposed to gentle showers; but care must still be taken that they be not suffered to become too wet. Air must be freely and daily given them; and when it is wished to have them flower strong and in full perfection, only one flower-stem should be allowed to each plant, all others should be rubbed off as they appear. Seeds of good auriculas should now be

sown in a box of fine light earth, and thinly covered, as the seeds are apt to lie dormant or rot when sown too deep. The box should be placed in a warm sheltered spot, and carefully defended from heavy rains. As the plants advance they will be readily conveyed from one situation to another in boxes or large pans, until they become sufficiently strong to be permanently potted off. These plants naturally, as well as the whole *Primula* family, enjoy the shade; care must therefore be taken, throughout their whole culture, not to expose them for any length of time to the scorching rays of the sun. Auricula seeds will vegetate more quickly, if placed on a little bottom heat, but as soon as they are sufficiently above ground they should be removed to a warm sheltered spot in the open air, for, by this means, they will be forwarded a little, and in cold wet springs and unfavourable situations, it is necessary; but in situations naturally warm, and in good seasons, they will not only come stronger, but a greater number of the seeds will vegetate, if sown in the open air or with the occasional protection of a hand glass; and the best sort of glass is that which has the top or upper part separate from the lower, as in the annexed figure.



Polyanthuses, in pots, will require the same mode of treatment as has been already recommended for auriculas, and seeds of them may also now be sown. As the common parent of the numerous varieties of polyanthus is a native of our sunny banks and warm sheltered fields, it is more hardy than its associate the auricula, whose common parent graces similar situations in Switzerland. A warm shaded border of light soil, moderately enriched with rotten manure, having a northern exposure, will

therefore be found a suitable place for them; or they may, in unfavourable situations, be sown in shallow boxes or pans, and placed in a situation where they can be shaded from the mid-day sun.

Carnations.—Carnations raised from layers and pipings last season, should now be potted off into full-sized pots, in which they are to perfect the flowers. These pots should be not less than one foot in diameter at top. The roots of this plant are subject to injury from excessive damp; therefore the pots should be well drained for them, and a sufficient quantity of mould prepared for potting them. Like all other plants which come under the above denomination, or which have attracted the attention of the florist, many soils have been recommended; and, as in most other cases, each individual estimates his preparation as the best.

We will subjoin the soils used by two respectable florists, as they have themselves published them, and as they appear rational and free of that quackery which is so much practised in compositions for florists' flowers.

Mr. Hogg of Paddington, notoriously known as a first-rate cultivator of the carnation, gives the following as his practice:—

"Three barrows of loam, one and a half ditto of garden mould, ten ditto of horse-dung, one ditto of coarse sand; let these be mixed and thrown together in a heap or ridge, and turned two or three times in the winter, particularly in frosty weather, that it may be well incorporated. On a dry day towards the end of November, I take a barrow of fresh lime, which, as soon as it is slacked, I strew over it while hot, in turning the heap; this accelerates the rotting of the fibrous particles in the loam, lightens the soil, and destroys the grubs, worms, and slugs. Lime is too well known as a manure to say any thing farther in its praise here. If there has been much rain during the winter, so that the strength of the compost is reduced, and the salts washed from it, I take about seven pounds of damaged salt, and add them to it, either dissolved in water or strewed over it with the hand. This, from an experience of three years, I have found to be attended with the most beneficial effects upon the future health and vigour of the plants.

During very heavy rains many florists cover the compost with tarpauling or double mats to prevent the nitrous particles from being washed out. This is also an excellent precaution. If any objection be started that the quantity of dung is too great in proportion to the loam, I answer that such an objection might be well founded, if the compost were to be used immediately on its being mixed together; but as it has to lie six months before it is used, I am decidedly of opinion that the quantity is not more than is necessary in order to ensure a luxuriant growth and generous bloom."

Mr. Maddock, an equally successful and well-known florist, gives the following as his practice:—

"One half rotten horse-dung, one year old, or that which has been used for a hot-bed for cucumbers, melons, &c.; one-third sound loamy earth, one-sixth coarse sea or river sand. These ingredients are to be mixed together in autumn, laid in a heap about two feet thick, in an open exposure, and turned two or three times during winter; or otherwise, the dung alone, after being used as a hot-bed, may be thrown together in a heap, in a conical form, in order to rot more perfectly; and as its surface freezes in winter, it should be pared off and laid on one side till the whole mass has been completely frozen throughout. This may be repeated as often as the season permits, and it will be completely fit for use the following spring. The earth and sand may be added to it in March, when wanted to fresh pot the plants for bloom. The whole should be well mixed and incorporated, and passed through a coarse screen or sieve to reduce its parts and take out stones or any other extraneous substance which it may contain. In country places, where the air is more pure, experience has pointed out the propriety of using less dung and more loam. The proportions of which, for such situations, may be reversed, viz.: one-half loamy earth and one-third dung, with the sand as before specified. The preparation of the compost, in other respects, is to be exactly the same in all situations."

The pots and mould being prepared, the plants should be carefully taken out of the small pots in which they have stood the winter, or if they have not been potted, taken carefully out of the bed, into which they may have been pricked out last

season as soon as they were fully rooted and separated from the parent plant. Let them be now placed in the pots already noticed, and gently watered as soon as potted; when a sufficient number are potted, let them be placed in an airy dry situation, and defended in wet weather by mats or canvas covers, where they will remain until taken into the greenhouse, or placed upon a flower-stand to bloom. All that will be now necessary in their culture till their flowers begin to open, or until the season of propagation arrives, will be to keep them regularly watered, and their flower-stems neatly supported by sticks to prevent them being broken.

Those which may not be considered sufficiently valuable for potting, may be now planted out in the borders of the flower garden, where they will come into flower in good perfection; and those which are considered border flowers, picotées, &c., should now be planted out in the borders of the flower garden, either singly, or in patches of three or four plants each, or they may be planted with good effect in beds, according to the size, style, &c. of the garden.

Pinks.—The pinks propagated last year should now also be planted out. The fine flowering kinds are generally planted in a bed or border by themselves, and protected from heavy rains, winds, &c., by occasional covering with mats, canvas, &c., supported by hooped rods placed over the beds. The pink, although also of British origin as well as the carnation, is much less tender and less choice in its situation and soil. Maddock, already mentioned, considers a soil as follows, all that is necessary in this part to produce fine pinks.

"A good fresh loamy soil dug and comminuted about two feet deep, and manured with a stratum of cow-dung two years old, mixed with an equal proportion of earth." This stratum to be about six inches thick, and placed about five or six inches below the surface.

PLANTING RANUNCULUSES AND ANEMONIES.

The planting of these roots should now be finished as early in the month as possible; and if the ground be dry, let them be occasionally supplied with water in a moderate degree.

HYACINTHS.

The hyacinths in beds or patches in the borders, will now, if the weather has been mild, begin to make their appearance. Those which are in beds, and may be considered fine, should be protected from occasional frosts, and also from too much rain. As the shoots advance, let them be neatly supported with sticks, as they are apt to be broken if left unsupported, the flower-spikes, if large and double, being heavy. They should also be protected from accidental injury, by being hooped over in a neat and secure manner, and occasionally covered with canvas, or Dutch reed, or garden-mats.

PROPAGATING VARIOUS KINDS OF GREEN-HOUSE PLANTS FOR PLANTING OUT IN THE FLOWER BORDERS.

Many kinds of exotics are of rapid growth, and produce their flowers in a state of greater perfection when planted out during summer into the borders of the flower garden, than if confined within the narrow limits of flower pots. Of these may be enumerated the *Senicio elegans*, which sometimes comes double from seeds, but is most generally propagated by cuttings; *Salvia splendens*, a plant of unusual splendour, introduced in 1823, from the Brazils; *Salvia Mexicana*, a species of the same family, and affording a beautiful contrast in its blue flowers with the bright scarlet flowers of *Salvia splendens*; *Heliotropium Peruvianum*, a plant of considerable beauty and great fragrance; many species and varieties of *Pelargonium*, particularly those with scarlet flowers; and of that numerous and interesting genus *Mesembryanthemum*.

There are many species of the latter which flower profusely during summer, when planted out in light sandy soils fully exposed to the sun, or upon rock-work, where they will continue to flower till destroyed by the frosts. *Hememris urticifolia* and *H. coccinia*, are plants well suited for similar purposes. Cuttings of all these should now be put in, and forwarded with all possible speed, so that they may be fit for planting out in the open borders by the middle of May. Where circumstances will admit of it, it is a good practice to strike a

number of these and similar plants in autumn. With little attention during winter, they will be fit to pot off in March, and if placed afterwards in close frames, with a slight heat, will attain greater perfection by the season of planting out.

Fuschias, Hydrangeas, and some other exotics, should be annually propagated in quantities for this purpose, but these seldom flower so well till the second year of their growth; whereas the former kinds produce their finest flowers the first season when properly treated.

PLANTING FERRARIAS.

The *Ferraria pavonia* is a plant of great beauty and of easy culture, and would be one of the greatest ornaments of our gardens, were the flowers less fugacious, their duration being only for a few hours. This apparent defect is amply remedied by planting them in masses, where a succession of flowers will be produced for a considerable time. The bulbs of this plant should be potted in small pots in February or March, and placed in a close frame, where they should continue until they be fit to plant out, which will be by the middle of May. They can then be readily turned out of the pots with the balls entire, and will produce their flowers in July, August, and September. As the plants advance in growth, they should be supported with neat sticks, as they are liable to be broken when exposed to rain and winds. At the natural season when the bulbs are ripe, which, as in the case of all bulbous plants, will be indicated by the decay of the leaves, they should be taken up, and kept in a dry place till their season of planting arrives. A correspondent in the Hort. Trans., recommends that a portion of the mould in which they grow, should be allowed to adhere to them, which will prevent their being too much dried up, while in an inactive state. The same end may be attained by packing them in boxes of sand. They increase rapidly by offsets, and may be purchased from the London nurserymen at five pounds per hundred.

ON THE CULTIVATION OF CORIOPSIS TINCTORIA AND SIMILAR ANNUALS.

There are many annuals which may be brought into flower much earlier in the season, and be much improved in size and the perfection of their flowers, by being sown in the latter end of summer, and protected during winter under frames, &c.; of this sort is the *Coriopsis tinctoria*, lately introduced into this country, and now cultivated in almost every garden. The whole of the varieties of *Cheiranthus annus*, or ten-week stocks, *Viola tricolor*, with its endless varieties; *Iberis umbellata*, *Lathyrus adorata*, *Delphinium ajacis*, *Centauria cyanus*, and many others; where these have stood the winter, towards the end of this month, or beginning of the next, they should be planted out where they are to remain in the flower borders. The ten-week stocks and *Coriopsis* will be considerably forwarded and improved, if potted into small pots, and kept under the shelter of a frame until they have attained the height of five or six inches, and until the weather has become somewhat mild.

PROPAGATING VARIOUS DOUBLE FLOWERS.

Double flowers are the pride of the florist, but are regarded by the botanist as vegetable monsters, produced by luxuriance of nourishment. Many of them have long been esteemed flower garden plants, and as the chance of producing them from seeds is so uncertain, the gardener has recourse to a prolongation of the plants by cuttings to increase or continue his stock.

Most herbaceous plants, with double flowers, are readily propagated by cuttings, whether they be annuals, biennials, or perennials, and the season of propagating them by such is in spring before the flower-stalks are too far advanced, and in autumn before the flowers are beginning to fade. Some, however, are not so readily propagated as others, of this the double rocket, *Hesperis matronalis*, furnishes an example. Of this plant there are two varieties, differing in the color of their flowers, the one being white, and the other purple.

The most rational directions for its cultivation which we have met with, appears in a communication to the Cal. Hort. Soc., by Mr. D. Robertson, of which the following is the chief detail: "After the flower is beginning to fade, cut down the stalks, and cut them into ordinary lengths of cuttings. Next cut off the leaves and smooth the ends, then make three slits with a knife in the bark or rind longitudinally, so as to separate or raise the bark for half an inch in length. When the cutting is inserted in the ground, the loose bark naturally curls up, and it is from this bark that the young roots proceed. The partial separation and the turning up of the bark seem to promote a tendency to throw out roots. The cuttings may be put into flower-pots, for the more readily protecting them during winter, or they may be planted in the natural earth, provided that it be light and fresh. Covering them with a hand-glass will forward their rooting, and placing them on a slight hot-bed will forward their growth considerably. By this method, stock-julyflowers and double wall-flowers may also be readily propagated."

Annual plants, to a certain extent, may be propagated on the same principle, and their existence prolonged for several years; by a somewhat similar process, double carnations, pinks, &c., have been long propagated, as well as by laying. There are, however, some double flowers which are not capable of being increased this way; of such are those with bulbous and tuberous roots, but as they increase so readily by those means, this circumstance is less to be regretted.

APRIL.

PLANTING DECIDUOUS TREES AND SHRUBS.

The planting of all deciduous trees and shrubs should be finished the first or second week in the month. In early seasons, this operation should be finished in March, unless the trees intended to be planted have been taken up and laid in by *the heels*, which will check their growth sufficiently to warrant their being finally planted out at this time.

PLANTING EVERGREEN SHRUBS.

This month and August are the two seasons in which these shrubs are found generally to succeed best after planting. The reason assigned by planters why these seasons are more suitable than any other is, that if they be planted early in spring, or during winter, they lie dormant till this time, and while in that state, their best and tenderest fibrous roots are injured, and not unfrequently perish. They are also exposed to injury while in the act of removal, by having their tender roots injured by frost, or cold cutting winds, to which their roots are more liable than those of deciduous trees or shrubs. By planting them at this season, they are less liable to these evils; besides, at this time evergreens are beginning to push out into shoots, which is always the most reasonable time for transplanting any tree, although, as stated above, deciduous trees are less sensibly affected by transplanting than such as are evergreen. Add to this, that about the end of April and the beginning of May, we have frequently warm showers, which, to shrubs of this description, are extremely beneficial, and are always much better for vegetation than water, however well it may be artificially applied. The reasons assigned for planting in August or September are, that they have made their shoots, and, if carefully done, will make fresh roots, and become tolerably established before

winter. At that season we have often genial showers, which to them is of the utmost importance. Experience proves these seasons to be the best for transplanting these plants; and upon an extensive scale, and in exposed situations, we would advise the adoption of it. At the same time, circumstances may warrant their removal at almost any day in the year. Evergreens are extremely fond of shelter and shade, and it is probably the want of these that is the principal cause of the failure of these plants, when removed at seasons when there is a long continuance of cutting winds without any rain. In our practice at Stratton Park we planted fifty thousand evergreens in one season, beginning in November and ending in February; the soil for the most part was of a strong clayey nature, and by no means favorable for plants in general, still the success here was complete, inasmuch as out of that number not two hundred plants died. Most of the plants were brought a distance of twenty miles, and were from two to three feet high. We attribute the success in this instance to the shade which the plants enjoyed in summer, and the shelter during the first winter after planting; as they were planted partly in very old plantations and partly in young ones, in both cases well sheltered and shaded. Evergreens, particularly laurels, may be removed for particular purposes at almost any day in the year, provided that they are taken up with good balls, and shaded, sheltered, and frequently supplied with water over the head as well as at the roots. Evergreens, as well as deciduous trees, of any reasonable size, may be removed, by being carefully taken up with good balls, and immediately planted on the spot in strong baskets. In this way they may be sent to a great distance with safety. In planting them, the pit should be made sufficiently capacious to hold the ball still inclosed in the basket, the materials of which it is composed will soon decay, and instead of preventing the escape of the roots will considerably tend to their nourishment, as in a few months they will be converted into vegetable mould. It not unfrequently happens, that fine specimens of evergreens, as well as deciduous shrubs, may be wanted for particular purposes, and at seasons when it might not be convenient to remove them in the ordinary way. To

meet such demands, it is well to have a stock of such plants as are peculiarly interesting either in their flowers or general habits in a portable state. At this season, therefore, evergreens for this purpose should be potted into large pots, and those of greater sizes planted into strong rough boxes, and plunged in the reserve-garden, or any convenient part of the shrubbery. When they are wanted, they can be taken up and plunged in such situations as their presence will decorate; and if neatly plunged, will appear as if planted for years. It is impossible to urge sufficiently the necessity of having plants in a portable state, so much being capable of being done by adopting that method. A few fine specimens of plants, capable of being removed at pleasure, will afford sufficient opportunity of changing the character of a considerable sized garden as often as the proprietor chooses.

The species of evergreens which are best calculated for removal at unusual seasons, are the common and Portugal laurel, *Aucuba*, evergreen privit, *Rhododendron*, *Daphne*, hollies, yew, and laurestinus. The success of all planting depends a good deal upon the length of time the plants are out of the earth, and no doubt often on the size of the plant. For extensive plantations, or large shrubberies, the plants should be rather small than otherwise; but for smaller plantations, and where immediate effect is required, evergreen trees and shrubs of considerable size may be made use of, and if properly taken up, planted, and frequently watered during the first season after planting, their success will be complete.

PLANTING BOX EDGINGS.

This is a good time for making new plantations of box edgings, or for repairing such as may be in want of it. The plants will succeed almost equally well whether rooted or put in as cuttings, by splitting the old plants into small pieces, and planting them about two inches apart with a dibble. Rooted plants should be laid, and not dibbled, in order that the roots may be properly placed in the ground.

CUTTING BOX EDGINGS.

Box edgings should now be cut where they require it, as all danger from frost will now be past, and the edgings may be put in proper order before the borders and walks are dressed up for the summer. In cutting these edgings, they should be done as neatly as possible, and be of an equal height and breadth throughout, and should not be allowed to exceed three inches in height and two in breadth at bottom, tapering upwards to a point. Nothing looks worse than misshapen box edging, particularly when allowed to attain a large size. The only real use of an edging of any kind is to separate the gravel of the walk from the mould in the border, and an edging of the above dimensions is sufficient for that purpose; larger ones only harbour vermin, and give the garden a neglected and careless appearance.

GRAVEL WALKS.

Gravel walks will now require to be regularly hoed, raked, weeded, and rolled, and kept in a neat and orderly manner during the summer.

GRASS WALKS AND LAWNS.

Grass walks and lawns will require to be regularly swept, rolled, and mown, from this time till November.

SOWING HARDY ANNUALS.

Annuals of this description may still be sown in the flower garden borders, where they are to remain to flower; and a few may be sown in the reserve garden, to be transplanted in May and June, to fill up vacancies where they occur.

SOWING TENDER ANNUALS.

Tender annuals should be sown again this month to succeed those which were sown last month; about the middle of

the month will be a good time: however, if this were neglected to be done last month, let it now be done without delay. Those which were sown last month, or earlier in the season, will require to be forwarded by being pricked out, and afterwards shifted into larger pots as they advance, and a regular brisk heat kept up, either by renewing the linings or making up fresh hot-beds for them, so that they may sustain no check in their growth. It is a rule, which should never be lost sight of, that, in the growing of tender annuals, particularly such as balsams, cockscombs, and globe amaranthus, the nearer the plants are kept to the glass the better; by which means they will not become drawn up weak and flower in a premature state. While the plants are in this state, let them have moderate supplies of water, with the chill taken off, as often as they may require it, all over-head, and let air be admitted daily, in such quantities as the state of the weather will permit. As the plants advance in height, so as to touch the glass, let the frames be lifted up a few inches at a time; and this practice should be followed as often as they may require it. The soil in which tender annuals should be grown, should be as rich and light as possible; indeed, balsams and some others are brought to their greatest perfection in entirely rotten dung; good light mould, enriched with rotten dung, and frequently watered with liquid manure, will bring these plants to great perfection, if they be allowed sufficient pot-room, and regularly shifted.

SOWING AND PRICKING OUT HALF-HARDY ANNUALS.

Many half-hardy annuals may still be sown upon a slight hot-bed, and many of such as were sown last month may now, if the weather be mild, be planted out in the borders of the flower garden; the more tender sorts may be pricked out in a nursing-bed, covered with a frame and glasses. They will attain a good size, and be fit for final planting out by the end of the month or the beginning of May. The more tender kinds of these plants should be, when fit, pricked out singly into small pots, and kept in a little bottom-heat till the end of the month, when they may be planted out with safety: of

these are palma-christi, tobacco; zinnia, several species; Indian corn, gourds, and some others.

FLORISTS' FLOWERS.—RANUNCULUSES AND ANEMONIES.

The more valuable varieties of ranunculuses and anemonies will now be coming into bloom, and, if planted in beds, can be readily protected from the effects of cold cutting winds and frosts, which would be liable to injure them materially, by covering them with hoops and canvas. This covering should also be permitted to remain on them during the hours of strong sun-shine; which, if not prevented, would, after they come into flower, tend in a short time to bring on decay in the flowers. But, if they be screened from all these occasionally, it will not only preserve the beauty of their flowers, but will continue them longer in bloom.

HYACINTHS.

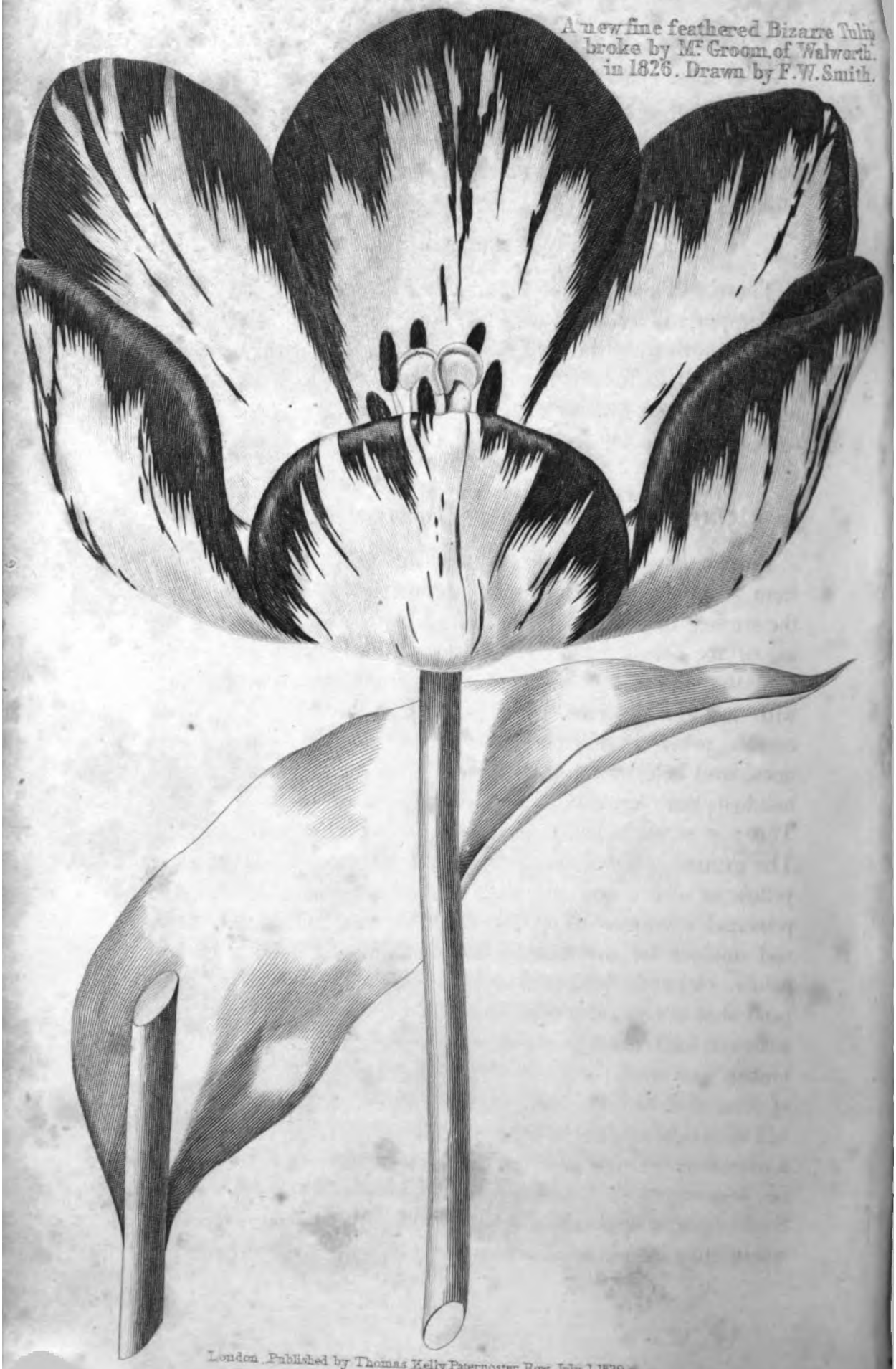
Hyacinths in beds will now be coming into perfection; the flower-stalks should be neatly supported with small sticks, to prevent their heavy heads of flowers from being broken. They will also require to be protected, as already directed for ranunculuses and anemonies.

CRITERION OF A FINE DOUBLE HYACINTH.

Florists, by common consent, have established amongst themselves certain properties of which particular flowers should be possessed, with the view of rendering them select. The properties of a fine double hyacinth should, according to their criticism, have the stem tall, strong, and erect, supporting a number of large bells or distinct *corollas*, each bell supported by a short and strong foot-stalk, standing in a horizontal position, so that the whole may have a compact pyramidal form with the crown or uppermost flower, and be perfectly erect. Each separate flower should be large, and completely double; that is, well filled with broad bold *petals*, appearing to the eye rather convex than flat or hollow. The flowers should

GROOM'S REMBRANT.

A new fine feathered Bizarre Tulip
broke by Mr. Groom, of Walworth.
in 1826. Drawn by F.W. Smith.



London. Published by Thomas Kelly, Paternoster Row, July 1. 1829.

occupy about one-half of the length of the stem. The colors should be clear and bright, of whatever colour they may be; those which are of a strong bright colour are preferred.

TULIPS.

These will also now be coming into flower, and they should be supported, as they advance, with small neat sticks, and covered both from the bad effects of frost, heavy rains, winds, &c., as well as from the noon-day's sun, which, if allowed to shine upon them for any length of time, would tend considerably to destroy the color and hasten the decay of the flower.

CRITERION OF A FINE VARIEGATED LATE TULIP.

Florists have agreed that a fine late tulip should have the stem strong, elastic, and erect, about thirty inches high above the surface of the bed. The flower should be large, consisting of six *petals*, which should proceed at first a little horizontally, and then turn upwards, forming almost a perfect cup, with a round bottom, rather widest at the top. The three outside petals should be rather larger than the three inside ones, and broader at their base. The petals should not be notched nor serrated, but perfectly entire at their edges. The top of each petal should be broad and well rounded. The ground color of the flower at the bottom should be clear yellow or white, and the rich colored stripes, which are the principal ornament of a fine tulip, should be regular, bold, and distinct on the margin, and terminate in finely-broken points, elegantly feathered or pencilled. The centre of each petal should contain one or more bold blotches or stripes, intermixed with small portions of the original color, abruptly broken into many irregular obtuse points. It is the opinion of some florists, that the central stripes or blotches do not add to the beauty or elegance of the tulip, unless confined to a narrow stripe exactly down the centre, and that they should be perfectly free from any remains of the original color. Such flowers appear very beautiful and delicate, especially where they have a regular narrow feathering at the edge; but

the greatest connoisseurs agree that it denotes the greatest merit where the tulip abounds with rich coloring, distributed in a distinct and regular manner throughout the flower, except at the bottom of the cup, where it should be a clear bright white or yellow, free from stain or tinge.

AURICULAS.

Auriculas will now be coming into bloom, and will require particular attention, that they may not be injured by dashing rains or cutting winds; for this purpose, they should be protected in frames, and covered with glasses occasionally, and placed so that they may be the least exposed to the rays of the sun; or, if such a situation be not to be conveniently met with, they may be shaded with mats or canvas, from eight or nine in the morning till three or four in the afternoon, in sunny days, and at all times carefully protected from much wet, as the farinaceous matter upon the petals, which adds so much to the beauty of these flowers, will be much injured, if not entirely washed off, by rain. They will require to be carefully supplied with water at their roots during the period of their flowering, but not over-head, for the reason above stated. Those who are high in the fancy of this flower, have stages made on purpose for them, and so constructed, that the plants are at the same time protected from rains, wind, and too much sun-shine.

CRITERION OF A FINE AURICULA.

An auricula, to be of the first rank in the estimation of the florist, should have the flower-stem sufficiently tall to elevate the truss of bloom a little above the foliage, so that it may be seen to greater advantage; it should, at the same time, be elastic, upright, and strong. The foot-stalks of the flowers should be also strong, elastic, and of a length corresponding to the number and size of the pips, which should not be less than seven in number. The pip is composed of the tub, with its *anthers* and *stamens*, the eye, and the outer circle, containing the ground color, with its edge or margin. These

THE AURICULA, HARRIS' PRINCE BLUCHER.

London Published by Thomas Kelly, Paternoster Row April 1 1829.

three should be all well proportioned, which will be the case if the diameter of the tub be one part, the eye three parts, and the whole pip six, or nearly so. Amateurs say that the pips should be round, but as this seldom happens, they content themselves when they nearly exhibit that figure. The summits of the *stamens* ought to be large, bold, and fill the tub well; the latter should terminate rather above the eye, which should be smooth, round, and without cracks, of a fine white colour, and distinct from the ground colour: this should be equal on every side of the eye, whether it be in one uniform circle, or in bright patches, and should be bold and rich, perfectly distinct at the eye, and broken only at the outward part of the edging. A dark or black purple, or bright coffee colour, contrasts best with the eye; a bright pink or rich blue is pleasing; but that which would be most desirable, in this point, would be a glowing scarlet or deep crimson, if edged with bright green; but this they seldom expect. The principal cause of the variegation in this flower is the green margin, and, in proportion to the size of the ground colour, it should be about one-half. The dark grounds of these flowers are for the most part covered, less or more, with a white mealy or farinaceous powder, which florists consider as a natural provision to protect the flowers from the scorching effects of the rays of the sun; white, of all colours, being the greatest non-conductor of heat.

CARNATIONS.

Carnations potted last month, should be supplied with water as they may require, and the pots kept clear of weeds. The plants should also be protected from heavy rains and cold cutting winds, by being occasionally covered with canvas supported on hoops, or kept in frames, and in bad weather covered with lights. If the pots be plunged in ashes, or decayed tanner's bark, the plants will require less water, as evaporation will proceed less rapidly than if the pots stood exposed on all sides.

PROPAGATING HERBACEOUS PLANTS.

Herbaceous plants may now be propagated by being divided at the roots; indeed, at this time, this is necessary, to a certain extent, to all of these plants. If they be left undivided, or not otherwise reduced in size, they will transgress the bounds prescribed for them, and some rapid growing sorts will overrun some of those that are of less rapid growth. Plants of this description, like all other plants, exhaust the soil upon which they grow, and in time, the spot where the plant was originally planted, will cease to support it. As they decay in the centre, they will extend themselves in circumference, and become unsightly, and will not produce their flowers so fine, nor yet in such abundance, as if frequently transplanted. In digging and dressing the flower borders, this should be attended to; and, as the operation proceeds, the plants should be reduced to a moderate size, and the parts taken off, planted out either in the reserve garden, or to fill up any vacancies in the borders, or to extend them if desired. Where they may not be wanted for any of these purposes, they should be planted out in the woods in favorable situations, so as to be seen from the walks or drives; and when established there, cannot fail to produce a pleasing effect, which is produced at a trifling expense.

PLANTING DAHLIAS.

Towards the middle of the month, dahlia roots may be planted in the flower garden borders, where they are to remain to perfect their flowers. As the varieties, and consequently the colours of these plants are now numerous, some taste is necessary in the arrangement of them at planting, so that a pleasing harmony of colours may be produced. Some cultivators plant them in rows by the side of walks or borders, and this is probably the best method when a collection is planted for the purpose of proving the varieties; and it will have an interesting effect when in bloom, provided the colours follow each other in tasteful gradation. But to produce a general effect, they should either be planted promiscuously through

DAHLIA FLORA PERFECTA.

London Published by Thomas Kelly, [illegible]

the flower garden singly, or in groups, in number and size proportionate to the magnitude of the garden. In either case, attention should be paid to a proper mixture of colours. Mr. Sabine, in Hort. Trans. says, "Dahlias look best in a large mass, unmixed with other plants. In this plan of growing them, some nicety is required in the due distribution of the sorts, so as to have a proper and good mixture of colours; and particular care is necessary to keep the tallest plants either in the centre or at the back of the clump, accordingly as it is designed to be viewed from one side only, or on all sides, and to place the whole so that there shall be no unevenness in the general shape of the entire mass, arising from the irregular arrangement of the individual plants according to their respective heights. The roots should be planted about three feet from each other every way. This distance will keep each sufficiently distinct, and yet so united, that the whole clump will have the appearance of an unbroken wood or forest of dahlias." He also admits that they may be planted in lines by the sides of walks, for the purpose of forming avenues with a good effect.

Dahlias are impatient of much cold, and the first frosts of autumn destroy them for a season, often while in their prime, being natives of Mexico, whence they were introduced into Europe in 1789. The first plants which were introduced were lost, and in 1804 they were a second time imported by Lady Holland, and first cultivated in her ladyship's garden at Kensington. To obviate this, or rather to elongate their period of flowering, has occupied the attention of gardeners for some years. No doubt, soil and situation are favorable in some instances, and their season of blooming will be from the beginning of June till November; but by far the more general time of their flowering does not begin before the end of July, and often the middle of August.

Cultivators have justly endeavoured to bring them into flower at as early a period as possible; and this being once attained, they will continue to flower till destroyed by the frost. For this purpose, they plant the roots in large pots in March and April, and place them in any hot-house at work, on the floor, paths, or indeed almost in any situation of it. When the

plants have attained the height of nine or twelve inches, which will soon be the case, they are placed in a colder situation, and so gradually hardened, that by the end of April or the beginning of May, they are fit to plant out, where they are to remain to flower.

At this planting out, they are carefully turned out of the pots, without disturbing their roots but as little as possible, and planted into the natural ground.

Dahlias will grow and prosper well in almost any soil, although a light sandy loam or soft sandy soil that is not rich, will produce the most handsome plants. In strong rich soils they are apt to grow too rambling and gross, and in such cases produce fewer flowers, and such flowers are much later in the season of appearing.

It is desirable to have the plants small, and to effect this, some cultivators have succeeded by growing them in large pots, boxes, and tubs; others, to effect the same end, have beaten the ground, while moist, round where the roots are planted, so as to render it as solid as possible, and impenetrable to the roots; others have adopted a species of training, which they commence when the plants are about two feet high, by bending the shoots down to within three inches of the ground, where they are held by hooked pegs; and as they advance in growth they are pegged down, so that when in flower they may be of any height required. This is only practicable where they are grown in clumps or masses, and the shoots so managed that the bare stems may be covered as much as possible.

As the shoots of such as are allowed to grow upright advance, they should be carefully and regularly supported with neat sticks, and fastened to them as they advance; for their growth being rapid, and their whole frame tender, are liable to be broken by wind, heavy rains, and many other accidents.

PROPAGATING DAHLIAS.

We may attribute the great variety of these plants, as well as their appearing in almost every cottage garden, as much to the facility of their propagation as to the real merits of their

flowers. Few plants are more readily propagated, by almost every mode, than the dahlia. By seeds they are increased, both in number and variety, with the greatest ease. The seeds ripen with us in most seasons; each flower producing, as is the case with most plants of the class *Syngenesia*, a number of perfect seeds.

The seeds are collected in September, by which time, in most seasons, many of them will be ripe. The preference should be given to seeds from dwarf plants, where the object is not to have varieties of the taller sorts; and seeds from semi-double flowers are more likely to produce double varieties than those of single ones. Opinions have been offered, that seeds from such florets of the disc which may have altered their form, may be more apt to produce double flowers, than such as may have retained their original form.

The seeds should be sown by the first of April upon a slight hot-bed, and when up, and sufficiently strong, potted into small pots, where they should remain in a gentle heat till the first of May, when they may be gradually hardened by exposure, to be fit for planting out in the open ground by the end of that month, where many of them will produce their flowers the same season. Those which may then be judged of sufficient merit, may be taken up in autumn, and the less valuable thrown away.

By cuttings of the young shoots, dahlias may be propagated freely, and by this means produce tubers and flowers the same year. By dividing the roots, they may also be propagated; and this operation will be safest performed after the roots have been potted and in a brisk heat for a few days. When vegetation becomes excited, the rudiments of the young shoots will be observed bursting through the crown of the roots; at such time, with a knife, divide the roots into as many parts as convenient, without injuring the tubers; each piece having a bud or young shoot springing from its crown, will be a perfect plant, and may be either repotted or planted out in the open ground.

By grafting: dahlias may be propagated by this operation as well as most strong-growing herbaceous plants having solid stems; although this species of propagation be new with us,

it has been long practised on the continent. The operation is thus detailed by a correspondent in the Hort. Trans.:— "The cutting intended for the graft should be strong and short-jointed, having on it two or more joints or buds. It must also be procured as soon in the season as possible; when obtained, select a good tuber of a single sort, taking especial care that it has no eyes: with a sharp knife, (for a dull edge would mangle the fleshy root, make it jagged, and so prevent a complete adhesion,) cut off a slice from the upper part of the root, making at the bottom of the part so cut a a ledge whereon to rest the graft. This is recommended because you cannot tongue the graft as you do a wood-shoot, and the ledge is useful in keeping the cutting fixed in its place while you tie it. Next cut the scion sloping, to fit, and cut it so that a joint may be at the bottom of it to rest on the aforesaid ledge: a union may be effected without the ledge, providing the graft can be well fixed to the tuber, but the work will not then be so neat. It is of advantage, although not absolutely necessary, that a joint should be at the bottom of a scion, for the scion will occasionally put forth new roots from that lower joint: the stem is formed from the upper joint. I therefore," he adds, "procure the cuttings with the two lower joints as near together as possible. After the graft has been tied, a piece of fine clay, such as is used for common grafting, must be placed round it; then pot the root in fine mould, in a pot of such a size as will bury the graft half-way in the mould; place the pot on a little heat in front of a cucumber or melon-bed. A striking-glass may be placed over the whole, or not, with little difference of effect. In about three weeks, the root should be shifted into a larger pot, if it be too soon to plant it in the border, which will probably be the case; for, supposing the work was begun in March, the plant cannot go out till the end of May, so that the shifting will be essential to promote its growth till the proper season of planting out arrive."

PLANTING OUT CHRYSANTHEMUMS.

The different varieties of *Chrysanthemum Indicum*, since their general introduction into our flower gardens, have added

a degree of splendor to that department, and that at a season when few other plants are in flower. They are highly prized by the Chinese, who are supposed to be in possession of upwards of fifty varieties of this plant. To the Horticultural Society we are principally indebted for many of the most splendid varieties with which our gardens are decorated. This plant early attracted the notice of that society, who have spared no trouble to bring together nearly forty pretty distinct varieties. The facility with which it is propagated, and being a plant almost sufficiently hardy to stand our winters with little protection, renders it the more valuable, as every one who is in possession of a small garden may indulge in the cultivation of it. At this time, plants originated from cuttings the preceding season should be shifted into larger pots, preparatory to their being placed in their summer situation; and such plants as may be of greater age should be also shifted at this time. The superabundant plants, or the earlier flowering kinds, may now be planted out in the open ground; many of them in favorable situations will flower in the open borders, and most of the varieties will flower, if trained to a southern wall. In such a way they have a handsome appearance, and in this way they have been successfully cultivated in the Chiswick garden. Where the intention is to reserve them for the green-house, conservatory, or drawing-room, in the months of November and December, when few other plants are in flower, they should now, when shifted, be plunged in finely-sifted coal-ashes in a warm and dry situation, where, during summer, they will only require to be neatly supported with sticks, accordingly as they extend in size, and be liberally supplied with water at their roots. Their flower-buds will here form in October, when they should be taken into a green-house, or other similar shelter, before the evenings become frosty, where they will perfect their flowers, so as to be fit to be removed to decorate the conservatory or drawing-room. By this mode of culture the plants will become large, and although profusely covered with flowers, may not be so convenient for the latter purpose, as if they were smaller. Cultivators, therefore, vary their modes of growing them, to suit the purpose for which they may be intended; and as this plant is of docile habits and rapid growth, a variety of ways have been tried to produce bloom upon small

plants. The Chinese, who are particularly fond of this plant, manage to flower them in a much smaller state, and in smaller pots than we are in the habit of seeing them. To attain this, they propagate them from cuttings, which they take off in May, and when rooted, pot them into small pots, in which they flower the following autumn. By this method, they manage to produce plants clothed with foliage, from the pot up to the flowers, which they have of a large size, by not allowing more than from three to five to remain on each plant. In this, and a liberal application of liquid manure, consist the whole of their culture.

We have observed in some of the London nurseries, a plan adopted which has the result of producing neat little plants with plenty of bloom, which in itself is as simple and complete as that of the Chinese; but the plants are not *all* so handsome as those by the preceding method. For this purpose, the plants are plunged out in the open borders where they are fully exposed to the sun, and continue to grow till the beginning of September, when the shoots that have shown flower-buds are bent down, and laid in the common manner into pots, of the sizes called large sixties or small forty-eights, where in a short time the shoots send out roots at the part laid in the small pots; and when these roots are sufficiently formed to support the young plant, they are disengaged from the parent, and after being tied up and cleaned, are removed into frames or pits, where they are shaded for a few days, and attended to with water, &c. They soon establish themselves, and perfect their flowers, when they are removed into the green-house or drawing-room. Such plants are from a foot to eighteen inches high, and produce from four to six fully perfected flowers. The buds which have naturally been formed are not all allowed to remain on, but, like the Chinese gardeners, they take them off, leaving only three, four, five, or six, accordingly as the plant may have rooted.

Liquid manure is given occasionally, to enable the plant to perfect fully its flowers.

Chrysanthemums planted out in the open borders, do not require to be ever taken up, unless the soil and situation be damp and uncongenial; and, in such cases, it is better to propagate annually by cuttings, for stock for future use, than to

hazard their surviving the winter. In dry and favorable situations the hardier sorts will stand our ordinary winters, with a slight covering of dry litter, coal-ashes, or such like, placed over them in the beginning of December, and removed by the beginning of March.

Chrysanthemums do not readily come into flower by artificial means, like many other plants, neither do they withstand any degree of frost. The only means, therefore, we have of prolonging their season of flowering, is by protecting them under glass. They will, if kept free of damp, continue to flower till Christmas. Neither do they perfect seeds with us, otherwise their varieties would soon become as numerous as that of the dahlia, and other popular flowers.

PLANTING LOBELIAS.

The whole family of *Lobelia* are peculiarly interesting, although the majority of them are plants of humble growth. The species most generally cultivated as flower garden plants are *L. cardinalis, L. fulgens, L. splendens,* and *L. siphilitica.* The first of these has long been an esteemed flower in our gardens; the second and third species are of modern introduction, but the splendor of their flowers has entitled them to a place in almost every garden; the last species is rather an old inhabitant of our gardens, and differs from the others in having blue flowers. The whole family are very readily propagated either by seeds, suckers, or cuttings. The seeds should be sown in pots soon after they are ripe, and as they are very minute, should not be covered with mould. The mould in which all the species, particularly the kinds above-mentioned, succeed best, is peat or bog-mould. Before the seeds vegetate, and while the plants are young, they require to be kept moderately damp; but after the plants have attained a considerable size, they cannot then be over-watered. Indeed, they may be grown on the margin of a pond or river to great perfection; and in such situations, when immersed under water, they are found to stand our winters, whereas, if left unprotected when planted in the flower borders, they generally perish.

The season of propagating them by suckers, begins about the first of October, that is, immediately after the plants have done flowering; at which time they send up from the old roots a great many suckers. These young plants being taken off, are potted into small pots, and preserved under frames till the spring, when they are planted out, where they are to remain to flower. We have often practised the following mode of protecting and propagating these splendid plants. In autumn, before the first approach of frost, the old plants are taken up, with a considerable portion of the surrounding mould attached to them, together with all the suckers or young plants. These are carried into an open shed, and placed upon shelves, where during the winter they are kept sufficiently moist by occasional waterings, so as to keep the plants alive; but care must be taken that they become not either too dry nor too moist. During frost, they are protected sufficiently by being covered with mats and straw. In spring they are taken out, and the young suckers taken off and potted into large sixties, and placed in a cold frame; here they remain until fit for planting out. When it is not convenient to pot the whole stock of them, they may remain in the shade, and be occasionally watered and kept clear of damp, until the proper season for their being separated and planted out. The shelves in this shed were fitted up similarly to the shelves in Oldacre's mushroom-house, and fronted the south. The roof being slated, it was perfectly free of damp. In this way we preserved many plants which would not stand our winters without some protection.

Mr. Sabine, in the London Hort. Soc., Vol. II. p. 400, details the practice of Mr. Hedges, late gardener to Lord Mansfield, at Caen Wood, who managed to cultivate the *Lobelia fulgens* in a way which produced plants and flowers of an astonishing size and splendor. "In October he takes off the suckers from the old plants in the usual way, and puts them into small pots, one in each pot, and keeps them in a cold frame till the middle of January. He then removes them into a cucumber-frame, where the heat is kept up to 65° of Fahrenheit's scale, by linings of hot dung. A pine succession-stove of the same temperature, will equally suit them. In the middle of February they are shifted into pots a size larger,

and at the end of March or beginning of April they are again moved into larger pots, and in the middle of May they are a third time shifted; the pots to be used for this last shifting are twelves. As soon as the plants are well rooted, after the last removal, they are carried into a peach-house or green-house, in which they continue till they flower, and are hardy enough to bear the open air. When they are preparing to throw up their flowering stems, and during their growth, it is necessary that they be kept very moist, which is effected by putting pans under the pots, and keeping them constantly filled with water. The plants so managed begin to flower early in July, and the spikes continue to grow and are covered with flowers through the autumn. The compost used in the pots is formed of equal parts of brown or yellow loam, and of leaf or bog-mould; to which is added sand, equal to one-fourth of the previous composition, the whole being well incorporated." A plant cultivated in the above manner was exhibited to the society, which attracted universal notice; and another, which was grown in the Caen Wood garden, measured nearly six inches in circumference at the base of the stem, and the height of the centre spike of flowers was five feet and a half.

The hardy *Lobelias* naturally throw up but one spike of flowers, but if this spike be stopped while young, a number will issue from the root; and although they seldom attain so great a height, are much more elegant in their appearance, and seem more vigorous, and produce a greater number of flowers. *Lobelias*, in the flower borders, are often considerably checked in their growth in dry seasons: whether they be cultivated in pots or planted out, it is material that they be abundantly supplied with water.

MAY.

PLANTING EVERGREEN SHRUBS.

Evergreens of all kinds may be planted any time during this month with success. If the weather be not showery, it will be necessary to water them both at their roots, and also over their heads, two or three times a week, with the garden-engine; and if the ground above their roots be covered with long littery dung, or other similar matter, to resist the drought, a great saving of watering will be attained. The shoots and leaves should never be allowed to become dry or parched either by the sharp winds, which we often have at this season, or powerful sunshine, which would be equally injurious to them at this period, when they have not yet struck root into the ground. Water is the principal food of plants; and if bountifully supplied to newly-planted trees, will greatly assist them in their re-establishment.

SOWING HARDY ANNUALS.

All kinds of hardy annuals may still be sown, both where it is intended that they are to remain to flower, and also on beds in the reserve garden, to be afterwards transplanted into the flower borders.

Those which were sown in March and April, should now be thinned, where they may have been too thickly sown, to a moderate and regular distance, according to the size and habit of growth of the plants. If the weather be showery, take advantage of it for this purpose, but if the weather be dry, let them be moderately watered after thinning, to settle the mould round the roots of the remaining plants, and forward their growth.

Those annuals which are of climbing habits, should be provided with supports to which to attach themselves, when they stand singly in the borders of the flower garden. Such sup-

ports may be made of wire-work in the form of cones, pyramids, &c., and of heights suited to the plants intended to cover them, or branches of trees may be made use of, to which such plants as do not naturally attach themselves should be trained. Those which are not of climbing habits, but which from their slender growth require support, should be trained to neat sticks or pieces of strong wire; which latter, if painted green, and annually collected in autumn and placed in the tool-house, will last for many years. For small and slender plants they are admirably suited, as they are sufficiently strong to support the plants, while from their size and colour they are not readily seen.

PLANTING HARDY ANNUALS.

Hardy annuals should now be transplanted from the beds upon which they were sown last month into the borders of the flower garden, where they are to remain to perfect their flowers. Take advantage of a showery day for this operation, or if not, let them be frequently watered, until they have taken fresh root.

SOWING TENDER ANNUALS.

Tender annuals for a succession to those already raised, may be sown by the beginning of this month. Of these, the principal are *balsams*, *globe amaranthus*, and *cockscombs*, which will prolong the season of those flowers by coming into bloom when those already sown are decaying.

MANAGEMENT OF TENDER ANNUALS.

Tender annuals, sown in March or the beginning of April, will now have attained a considerable size; and to have them in perfection, they will require repeated shifting into pots, increasing also in size. In shifting them from one pot to another, care should be taken not to break the balls or injure their roots, as any check to them will be apt to start them into flower in a premature state. They should be kept in a

steady temperature of 60° to 65°, and plentifully supplied with water, and placed as near the glass in the frames as possible, to prevent them from being drawn up slender. The mould in which they should be planted should be light, and of the richest nature. The dung of an old cucumber-bed reduced to mould, so as to pass freely through a coarse sieve, and having lain for twelve months at least fully exposed to the action of the weather, and repeatedly turned, will of itself be sufficient to grow tender annuals in, until they have attained nearly their full size, at which time they should be shifted, for the last time, into full-sized pots; and to such rotten dung should be added one-third of rich maiden loam, which will afford additional support to the plants during their flowering state, and will tend to cause them not only to bloom stronger, but also to retain their flower much longer. During their whole growth, they should be frequently watered with liquid manure at their roots, and allowed plenty of room in the frames, so that they may branch fully out on all sides. As these plants are of short duration, it is necessary to have successional crops coming on; and, in order to have a constant supply, it will be necessary to sow in February, March, April, May, and June: each sowing to be in pots; and as soon as the plants are making their *rough* leaves, they should be potted into pots of the size called small sixties, and placed into a hot-bed, on a stratum of saw-dust or rotten tan, as near the glass as may be judged safe at that early period. When the plants have made some progress, and nearly filled the pots with their roots, they should be carefully shifted into small forty-eights, and again placed near the glass in the frames, and a brisk growing heat kept up to them. In this way they should be kept growing until their final shifting into pots of sizes corresponding to the respective size of the different species of plants cultivated; *balsams* requiring pots ten or twelve inches in diameter; *cocks-combs*, pots eight or nine inches, &c. During their whole culture, air should be freely admitted to them when the weather will permit of it; and as the plants advance in height too near the glass, the frames should be lifted up.

TRANSPLANT SEEDLING PERENNIAL AND BIENNIAL PLANTS.

Perennial and biennial seeds sown last month, or in March, will now be ready to transplant or prick out into nursery-beds in the reserve flower garden, there to attain sufficient strength to fit them for being finally planted out for good. The most convenient mode of cultivating these, is to prick them out in beds four feet wide, and place the plants about six inches apart each way. After they are planted, they should be shaded both from drying winds and powerful sun-shine, and liberally supplied with water as they may require it. These are to remain here till autumn, when they may be planted out in the flower borders.

SOWING BIENNIAL AND PERENNIAL FLOWER SEEDS.

Such of these seeds as were not sown before, should be sown as early this month as convenient, that they may attain a sufficient size to be planted out early in autumn.

PROPAGATING HERBACEOUS PLANTS BY CUTTINGS.

Many of the more delicate herbaceous plants are propagated by cuttings of the young shoots, particularly those sorts that are not readily increased by dividing their roots; as these plants advance, their propagation should be attended to. A shaded situation in the reserve garden will be found the most convenient place for this purpose. When the operation of propagation is to be carried to a considerable extent, narrow beds should be prepared for the purpose, of light sandy peat, or light sandy loam, and some of pure white sand, to the depth of from three to nine inches, according to the size of the cuttings to be used. These beds should be of the breadth of the garden hand-glasses, which should be placed over them as soon as the cuttings are planted, and kept carefully shaded until they have all struck root; when they may be either planted out into nursery-beds, or otherwise, according to circumstances.

PROPAGATING HERBACEOUS PLANTS BY DIVIDING THEIR ROOTS.

Many of the more rare herbaceous plants, which do not readily perfect seeds in this country, or are short-lived with us, may be prolonged by dividing their roots, either by making cuttings of the stronger roots of some species, or by dividing the roots, having a portion of their crowns or the rudiments of the stalks attached to them. In either case, they should be carefully separated and planted in a bed prepared as above for cuttings, and covered with a hand-glass until they have taken root.

FLORISTS' FLOWERS.—CARNATIONS IN POTS.

As the stalks of the carnations in pots advance, they should be neatly and securely supported, by being tied to neat sticks, or wire rods, to prevent their flower-stem from being broken. The mould in the pots should be occasionally stirred upon the surface, and part of it removed, and a fresh surfacing of mould applied. They should be regularly supplied with water every evening; and where it is intended to have a few fine large flowers, all those which issue from the side-stalks should be displaced. The plants should be shaded from the full sun either with mats, or placed in a situation sufficiently shaded, but by no means under the shade or drip of trees.

CARNATIONS IN THE FLOWER BORDERS.

As the flower-stalks advance, they should be supported with neat sticks, to prevent their being broken, and the surface often stirred up with the hoe and rake round them, which will encourage the production of strong grass, and afford additional strength to the flower-stems. In dry weather, they should be occasionally watered, according to the state of the weather. Some recommend thinning out the flower-buds of the border carnations, with a view to have the remaining ones finer; but if the ground has been properly made for them, and if they be at this time frequently watered, we see little reason for this

operation. The plants, if strong, and if the border has been well made, and watered in dry weather, will produce abundance of good flowers, and for a long period.

PINKS IN BEDS.

The finer pinks in beds will require to be refreshed with water in dry weather, and have their flower-stems neatly tied up as they advance. Those who are ambitious of fine flowers, seldom allow more than two or three flowers to remain upon each stalk. The surface of the beds should be frequently stirred up; and if it should sink, so as to leave the plants exposed to the drought, a little fresh mould should be laid upon the surface, which will greatly strengthen the plants.

AURICULAS IN POTS.

The fine auricula plants in pots, which will now have done flowering, should be removed from the stage, or out of the frame where they perfected their flowers, and be placed upon a dry airy spot, where they may enjoy the morning sun only till nine or ten o'clock. In such a situation they should remain till the middle of September.

During summer, the pots, and the ground on which they stand, should be kept clear of weeds, and all decayed leaves taken off as they appear. Where offsets are strong, they may be now disengaged from the parent plant, and planted in a shaded border till September, when they should be taken up and potted.

Let the plants in pots be supplied once a day with water in dry weather, and also care be taken that they be not injured by too much wet, particularly in wet seasons, or towards the end of summer; for although the auricula requires a considerable portion of water during summer, still it is impatient of too much moisture both in autumn and spring.

POLYANTHUSES IN POTS.

The directions given for auriculas are also applicable to polyanthuses; they are much seldomer found in pots, generally succeeding perfectly when planted out in a shady border.

HYACINTHS IN BEDS.

The hyacinths which may still be in flower, should be protected, by being covered as directed last month, and those which are past flowering should be taken up. But this should not be done until the leaves become withered and yellow, and begin to decay. A dry day should be chosen for taking up those roots; and as they are taken up they should be placed upon mats, or some dry clean place, to dry and harden. In the course of a fortnight they will be fit to be cleaned and laid by till their season of planting comes on.

TAKING UP BULBS WHICH ARE NOW PAST FLOWERING.

As the bulbous-rooted plants first planted will now have finished flowering, and their leaves beginning to decay, they should be carefully taken up, and stored in a dry airy room until the season of planting arrives. It is not necessary that all bulbous-rooted plants be thus taken annually up, but it is necessary for all the finer sorts, in order that the roots may be examined and the offsets or young roots removed, which is the mode by which these plants propagate themselves. Besides, the bulbs being taken up and kept in a dry place, have thereby a respite from action, which respite can be lengthened at the pleasure of the cultivator. Bulbs so treated are supposed to flower stronger than if they were left altogether in the ground. Whether this be the case or not, it is an important feature in their cultivation to take them up annually, and the less valuable ones in two, three, or four years, according to circumstances, that their offsets may be taken off for increasing the stock, as well as preventing an unnecessary number of plants from springing from the same centre, and thereby becoming

so weak that the flowers, though numerous, would be good for nothing.

TRAINING AND SUPPORTING PLANTS.

Climbing-plants and shrubs should be regularly and neatly nailed or tied to the walls, pales, or supports upon which they are to be trained; and all herbaceous and annual plants should also be supported where they require it. Nothing looks so slovenly as to see plants rambling into confusion, or blown about and broken by high winds or heavy rains. The pruning-knife should be freely used in the arrangement or disposal of them, and such branches as may be broken or injured, as well as a portion of them where they grow too thick, should be removed. In supporting plants in the flower borders, much ingenuity may be displayed by selecting supports suited to the habits of the plants. The rambling growing kinds may be judiciously supported by using branches of trees with many twigs upon them; and the more crooked and rustic branches of oak, or other rugged growing trees, either with the bark left on or taken off, will form excellent conductors for *sweet peas*, *convolvuluses*, and such like rapid growing plants, and to such the plants will naturally affix themselves sooner, and more firmly, than to bare poles or finely-painted sticks, which have little of that natural appearance which should harmonize in all parts of the flower garden. Whatever conductors or supports are used, care should be taken to hide them as much as possible; and in tying them to their supports, it should be done so as to leave the plant in its natural form as much as possible. This cannot ever be well done, if the plants be once allowed to attain too great a size or age. The supports should be placed to them before they really want them, and as the plants advance in growth be neatly and securely trained to them. From the want of sufficient attention being paid to the proper management of flower-garden plants, as far as respects training and supporting, arises that want of order and neatness which we always see when this is not scrupulously attended to; and if that attention be not paid at an early period of the season, it cannot be afterwards corrected.

Climbing and creeping-plants, from their profusion of blossom and their utility in covering disagreeable objects, as well as the assistance which they afford us in producing something of picturesque or natural appearances in gardens and shrubberies, are often too much excluded from our gardens, in consequence of the great confusion into which they are too often allowed to run, from a want of training and support while young; whereas, when properly attended to, they even of themselves give a degree of well-kept appearance to the other parts of the grounds, producing pleasing associations and affording both shelter and shade.

Such plants as are planted against walls or espaliers, should be now examined, and their young shoots nailed or fastened to the wall or trellis. When the object is to obtain a thick mass of foliage, the leading or strongest shoots only should be nailed in, and the lateral and weaker branches allowed to remain in their natural position; but when a profusion of bloom is desired, and such is the case generally, particularly with rare or delicate plants, pruning to a certain extent must be attended to. Here, as in all other cases relating to pruning, a judgment must be formed of what wood is likely to produce flowers and what is not; as much of the former must be laid in as can be without confusion or crowding one another, and a supply only of the latter to fill the naked parts of the wall or espalier, and to provide a supply for the following season of such wood as will, in its turn, produce flowers also.

JUNE.

CARE OF NEWLY-PLANTED SHRUBS AND ORNAMENTAL TREES.

All newly-planted shrubs and ornamental trees should be frequently and liberally supplied with water both at their roots and also over their heads, with the garden-engine. The ground round their roots should be mulched with long littery dung, straw, or such like matter, to prevent the drought from their roots. Those which are of a large size, and are liable to be blown about by the wind, should be frequently gone over and the ground regulated round their stems, and all such as require it should be supported with stakes.

TRANSPLANTING HARDY AND HALF-HARDY ANNUALS.

All sorts of hardy annuals may now be planted out, where they are to remain in the flower garden borders, taking advantage of cloudy or showery days. All sorts of half-hardy annuals, and many tender annuals, may now also be planted out; the half-hardy ones from the beds, pots, or boxes in which they were sown, and the more tender from the pots into which they have been potted, and have hitherto been growing. As soon as planted out, they should be watered and shaded until they have struck fresh root into their borders, after which they will only require to be supported with sticks for the season. Annuals of considerable size may be safely transplanted, either where they may have come up too thick, or where it is necessary, from other causes, to remove them to fill situations in want of them, or to pot for particular purposes. In removing them, let them be taken up with as good balls as possible; and if not done in showery weather, let them be well shaded and watered. All patches of hardy annuals, which may have come up too thick, if they be not wanted for transplanting, let them be thinned out, so that each plant may have room to

grow to its full size. Most kinds of hardy annuals may still be sown to come into flower in autumn.

TENDER ANNUALS.

The tender annuals, now nearly full grown, should be removed from the frames in which they hitherto have been growing, and placed in the green-house, which will be by this time cleared of most of the plants usually kept there, and which may be kept gay all summer by being kept filled with annuals. There also they will increase in size, and be at all times ready to be removed into the drawing-room, or wherever they may be wanted; or, they may be placed in the open air, in situations perfectly sheltered both from high winds and heavy rains.

Such as are still in frames, and intended to succeed those now in flower, should be allowed plenty of air during the day, and also an abundant supply of water at their roots once every day at least.

PROPAGATING FLOWER GARDEN PLANTS BY CUTTINGS.

Such herbaceous plants as are either rare or valuable, or of such as it is desirable to have a great stock, may be now successfully propagated by cuttings of the lateral shoots of their stems, planted in fine sand, either in pots, boxes, or in a border prepared for the purpose, over which should be placed hand or bell-glasses, for the exclusion of air, until such time as they have began to make roots, when the glasses should be removed gradually. During the time the cuttings are without roots, they should be shaded daily and watered sparingly; when of sufficient strength, they should be transplanted into nursing-beds or potted into small pots, in which they are to stand all winter.

TAKING UP BULBS.

As the bulbous-rooted plants, such as *tulips, hyacinths, polyanthuses, narcissuses, anemonics, ranunculuses,* &c. have

finished flowering, they should be taken up, and when dried, placed in the root-room, or in some dry airy house, each sort kept separate until the season of planting arrives. Dry days should be selected for taking them up; and when that is done, they should be laid upon mats thinly to dry, in a shaded situation, that the process of drying may go on slowly and gradually. When they are perfectly dry, they should be well cleaned, all the large roots separated from the small ones or offsets, and each sort carefully labeled. *Jonquils* should not be taken up every season like other bulbs, as they are found not to flower so well the first season after planting; their removal should only be considered necessary once in two, three, or four years, and that chiefly for separating the bulbs, which will by that time become too numerous, and if not separated would destroy one another. Some gardeners carry this system of taking up their bulbs to the extreme, and even take up *crocuses, snowdrops, irises, crown imperials,* and *common narcissuses* annually; while others, and by far the best cultivators, only take these up once in two or three years, in order to thin out their clustered roots, or for the purpose of propagation.

PROPAGATING CARNATIONS AND PINKS.

If the season has been favorable, the carnations and pinks in the borders will be by the end of this month fit to be propagated. It is material to begin this operation early, as the plants will thereby attain greater strength before the approach of winter, and be in a state to flower stronger next season. The modes of propagation are three; first by seeds, and this is always adopted when the object in view is new or improved varieties, and is yearly practised by the florist, who bestows considerable care in hybridizing two favourite varieties of opposite properties, so as to obtain a variety partaking less or more of its parent. The second is by pipings, or cuttings of the grass or shoots of the present year, and is most commonly practised in the propagation of pinks, as being expeditious, and generally certain; although they are sometimes also propagated, especially some of the more rare or scarce

sorts, by laying, which is the third mode of propagation, and almost always practised with carnations. The first mode, or raising by seeds, is performed in spring, and is seldom practised by any but the florist, to whom we are indebted for the many varieties of these beautiful flowers with which our gardens are adorned. Carnation-seeds do not often ripen in this country, owing principally to the shortness of our summers, but it is imported from Switzerland, and if kept from the air, will retain its vegetative properties for years; it is usually brought to us in phials well-corked, and seeds brought from abroad in this manner are found to vegetate freely; but in consequence of those who collect it, not taking the trouble to impregnate different sorts together, it is seldom that valuable kinds are produced, sometimes not one in a thousand; and even from carnation-beds cultivated in this country, a celebrated florist reckons the chance of getting a good flower being as one to one hundred: and the florist who raises six new carnations in his life-time is considered fortunate. So prone is this flower to sport, that seeds taken from the same seed-vessel has been often known to produce flowers of all the different varieties, that is *bizarres, flakes,* &c. The seeds which ripen from the end of August to the beginning of October, should be kept in the capsule or seed-vessel, in a dry room, till the beginning or middle of May, when it should be sown in pots filled with the compost in which the plants are cultivated, and merely covered with a thin sprinkling of the same compost finely sifted, sufficient to cover the seeds. At that season of the year, artificial heat is not necessary; the pots should therefore be placed in an airy part of the garden, partially shaded from the heat of the sun, and kept moderately moist, but never very wet. As soon as the plants appear about three inches high, they should be planted out on a bed of prepared compost, or good light rich garden-mould, at about ten inches or a foot asunder, and while in that situation, carefully defended from much wet and frost, by having mats or lights placed over them. These plants will most generally bloom the following summer.

The second mode of propagating the carnation is by pipings, or cuttings of the young shoots. Maddock, a celebrated culti-

vator of this flower, considered this a precarious method, and informs us that five thousand plants were piped one season, of which not above two hundred failed. Whereas, the year following, above two thousand failed out of the same number, although, in both seasons, the cultivation had been the same, without the least variation. He, however, observes, that some sorts succeed by this mode better than by laying, but that it requires great experience to distinguish such sorts from the rest. The cultivator has often to have recourse to piping, when the shoots are too short for laying, or where shoots may be broken off, or sent him from a distance, of such sorts to which he attaches a particular value.

Piping is performed by preparing the pipings or cuttings of the young shoots having two complete joints, that is, being cut off horizontally close under the second joint; the points of the leaves are to be shortened, leaving the whole length of the cutting from one inch and a half to two inches, or longer according to its strength. Some cultivators pipe their carnations by cutting them off under the third joint, but the second is most generally preferred, as the third is more hard and woody, and the pipings do not strike root so soon, nor form afterwards such handsome plants. Accordingly as the pipings are made, they should be put into a vessel of clean soft-water for a few minutes, and as soon as possible planted in the bed prepared for them, which should be as follows: A slight hot-bed should be put up for them a few days previously to the pipings being made, and covered with a few inches of fine light rich compost, which should be rendered regular and smooth, and slightly beaten down with the back of a spade. The pipings being ready, the bed should be moistened moderately, and the pipings taken out of the water, and inserted into the bed singly, in their wet state, about half an inch deep. No more of the bed should be moistened at once than is to be filled with pipings immediately after, for if not done while moist, the mould would become too compact for the pipings to enter, which they should do freely without the use of a peg, as in the way of putting in cuttings of plants generally. As soon as the pipings are placed in the mould, they should be gently watered to settle the mould fairly about their bases, and a bell-

glass placed over them as soon as the leaves become perfectly dry, which will be in a short time. On placing the glass over them, press it gently into the mould, the better to exclude the admission of air. This being done, all that is further required is to attend to shade them regularly from the sun, and clear them of all appearance of damp or decay accordingly as it may appear, and give them water when necessary; but this latter may not be required until the plants begin to root, which, as soon as it has taken place, the bell-glasses are to be gradually raised until they be entirely dispensed with. If it should be necessary to water them, at any time, before their roots are formed, it should be done early in the morning, and the glass left off for a few minutes until the leaves become dry. They should also be inured to the sun by degrees, beginning by allowing it to shine upon them in the mornings and evenings, until they can bear it with safety, after which they will soon make progress in their growth.

The third and most successful method of propagating carnations is by laying, and it is that which is most generally practised. The precise time for beginning this operation is to be determined by the forwardness or backwardness of the season or situation; the end of this month is often a good time, while some do not begin before the middle or end of the succeeding one. Hogg of Paddington, a celebrated cultivator of this flower, does not begin before the 21st of July, and continues laying till the 21st of August. Others begin before the flowers begin to expand, and are guided by the shoots or grass when it is of length and strength sufficient to admit of the operation; whilst, on the other hand, many do not begin till the flowers are fully expanded, or beginning to fade. According to previous observation, the earlier that the plants are laid, the stronger will they be before the winter sets in, and consequently will be better calculated for producing an abundant bloom the following year. The operation of laying consists in first cutting off the lower leaves of the young shoots all round the plant quite close, and then shortening the leaves at the extremity of each shoot. An incision is then made, by entering a sharp pen or budding knife about a quarter of an inch below a joint, and passing the knife up through the

centre of it, and also through the joint next to it. Thus far the operation is completed. The bed or mould round the plants should have been previously stirred up, and a small hill of fine light rich mould raised round their base. A number of small hooked pegs should be in readiness, and the layer prepared, as already described, should be bent down and buried about half an inch below the surface of the mould, in which position it should be secured by placing a hooked peg, so that it will hold the part of the layer deprived of leaves under the mould, while the top of the shoot is made to take a perpendicular direction, making the bend in the layer where the incision commenced; the mould being pressed firmly round it, it is finished: the whole of the shoots, or as many as may be intended to be laid, being, in like manner so treated, the whole are well watered, and shaded for a few days during the middle of each day. It is advisable to dress all the shoots of each plant, however great the number, or often of two or three plants, if thin of shoots, before they be pegged down, in order that they may be partially dried before they be bent down or buried in the mould. They become less brittle when partially dried, and are therefore less liable to break in the operation; besides, the sap having partly escaped will not, after being laid in the mould, be so liable to engender damp, or a disposition to decay, which sometimes is the case, when the shoots laid are succulent and full of sap. Some cultivators, as a preventive, cut off the point or nib of the tongue or talus, immediately below the joint, and consider that it assists the protusion of that granulous matter from which the fibres proceed.

Previously to the operation of laying being performed, the plants should have a good watering, particularly if dry weather, as, after the fresh mould is laid round their roots for the reception of the layers, neither the rain nor the water from the watering-pots can so readily penetrate to the roots of the plants without endangering the young layers, or displacing the mould in which they are placed.

When the young plants are properly rooted, which will be the case with some sorts in three weeks, and with others in four or five, provided that they have been attended to with

plenty of water, they should then be disengaged from the parent plants, by being cut off about an inch nearer the old plant, than where the roots of the young one are protruding. They should be carefully taken up, with as much ball at their roots as will adhere to them, and planted out in nursing-beds, to remain till wanted for planting out into the flower garden borders; but those which are considered as the most valuable sorts should be potted, one plant in each pot, of the size known as small forty-eights, and placed in a frame and shaded till they have taken fresh root and have begun to grow.

Pinks are propagated, as has been already observed, like carnations, by seed, pipings, and layers.

In the first place, to produce new varieties, *by seed.*—The pink being a much hardier plant than the carnation, it ripens its seeds more frequently with us, and is sown and afterwards treated exactly like the carnation.

By pipings.—This is the most usual method of propagating this flower, and is performed at that time when the young shoots are sufficiently strong to admit of the operation, which is generally during or immediately previous to its flowering. The operation is performed the same as has been already described for carnations, although many do not apply any bottom-heat. The application of a slight bottom-heat is the most certain and also the most expeditious method, the plants being much sooner fit for transplanting into nursing-beds.

Pinks are also sometimes propagated *by layers*, but this is only adopted when the sorts intended to be propagated are of a delicate or valuable nature; but it is never carried to any extent, as it is both tedious and troublesome.

AURICULAS AND POLYANTHUSES.

Auriculas and polyanthuses in pots should be kept in a shaded situation during the heat of the summer months, and supplied with water plentifully. Indeed, all plants of the family *Primula* should be kept in shaded and rather damp situations in summer; as, if exposed to the full sun, they will do little good, being for the most part plants of shade or natives of cold and humid atmospheres.

ALPINE PLANTS IN POTS.

Alpine plants in pots will require to be plentifully supplied with water mornings and evenings, before the sun shines upon them and after it has set; not that they require such abundant supplies of that necessary element, but the intention of repeated waterings is to cool the atmosphere around them, which at this season is too warm for many of them, particularly such as are natives of northern latitudes. They will also require to be often gone over, and all weeds picked out of the pots as they appear, and a watchful eye kept that they be not destroyed by slugs or worms. Those which are annuals should be attended to, when their seeds ripen, and immediately sown, as many of the more rare species are apt to go off after flowering; and it is therefore necessary that they be propagated either by saving their seeds, or by cuttings, or dividing at the roots.

Alpine plants planted upon rocks will require occasional watering, as their roots do not strike deep into the soil in which they grow; and being generally elevated above the general surface, are therefore more liable to be injured by droughts of long continuance.

SUPPORTING AND TRAINING PLANTS.

Support and train all plants that require it, which will give a degree of regularity, order, and neatness to the flower garden. Prune all those which require it of straggling shoots, or such as may have been injured, and thin those which are too thick of branches. Cut down all dead or decaying shoots of such plants as may be past flowering; and if the borders appear too thin in any part, let plants be brought from the reserve garden to make up the deficiency, in which there should always be a stock of plants and shrubs of great variety in pots, tubs, or boxes, ready upon all occasions to make up deficiencies, or indeed, occasionally, to give quite a new feature to the flower garden. This mode has been too little attended to in this country, but with the Chinese it is carried to a great degree of perfection; indeed, the whole contents of a Chinese flower

garden are portable; hence, with little trouble, they can metamorphose their gardens as often as they choose, with as much ease as they can alter the arrangement of the furniture in their houses.

DRESSING THE FLOWER BORDERS.

The borders of the flower garden must be carefully attended to, and no weeds allowed to make their appearance; they ought to be repeatedly hoed and raked, whether there be weeds in them or not, to give an air of cheerfulness and neatness to them. The oftener this operation is carried into effect, the less trouble will be given. All decaying branches or plants should be removed, and the plants regulated and tied up before the borders are finished; the edgings, if of box, ought to be new cut, or, if of turf, should be gone over with the edging-iron, and cut neatly and fairly. The grass should be kept well mown and rolled, and no litter allowed to be seen within the boundary of the garden. The gravel walks, if any, should be regularly picked, hoed, raked, and rolled.

PRUNING ROSES.

Many of the more delicate and fine French roses are apt to die at the points of the shoots, when pruned in winter or early in spring. To remedy this evil, a second pruning of the tender shoots should be now performed, or when the flowers fade. In the same manner as in winter pruning, all dead and decaying wood should be cut out, and those shoots which have done flowering, should be shortened back to a healthy strong bud; but those shoots, the buds of which have not yet flowered, may be left unshortened till the end of September or the beginning of October. Some prune all their best roses at this time, and their common sorts in winter, in the usual way.

JULY.

PLANTING EVERGREEN TREES AND SHRUBS.

Towards the end of this month, if the weather should be showery, evergreens may be successfully removed; box edgings laid and clipped, and evergreen hedges of all kinds cut. These hedges are not so generally planted now as formerly, when a formal and stiff style of gardening was in vogue, and in which they formed a prominent feature. As fences, or screens for shelter, they have their uses; and if planted in irregular lines, and not clipped, they may be admissible to a certain extent, and will answer many of the uses of dense shrubberies, without taking so many trees in their formation, or without occupying so much ground.

TAKING UP BULBOUS-ROOTED PLANTS.

As the beds of bulbous-rooted plants have done flowering, let them be taken up, as already directed, and stored by till their season of planting.

PROPAGATING CARNATIONS AND PINKS.

Continue to lay and pipe carnations and pinks, which will, by the beginning of this month, be in good order. (For full directions, *see last month.*)

CARE OF CARNATIONS AND PINKS COMING INTO FLOWER.

The more choice carnations, in pots or in prepared beds, should now be attended to. Those in pots should be removed to the green-house and placed in a shaded situation, where they will expand their blossoms without injury; and where there is a stage-frame on which to place these plants, it should now be filled with them. Previously to taking them either into the green-house or stage-frame, the pots should be cleaned

and the surface of the mould stirred up, to give them a neat appearance. Their flower-stalks should be neatly supported, and where there are too many flower-buds upon the plants, they should be thinned out. Cut off, with a sharp knife, all the smallest flower-buds, in order that the larger may have room to expand their petals, and that they may not be robbed of a due share of nourishment.

Such of the flowers as may appear to burst or open sooner on one side of the calix than the other, should be assisted by opening the opposite side with a sharp-pointed pen-knife, in two or three places, to assist the petals in their regular expansion. This process of slitting the flower-pod must not be done in a careless manner, nor too much be done at a time, but repeated frequently, and done with care and judgment. It is also of much use, in order to prevent this premature bursting of the calix, to tie it round near the middle with a fresh bit of matting or other bandage. The florists most generally for this purpose use narrow slips of bladder, which they wrap round the bud, and fasten them to it with gum-water.

To prolong the season of these flowers, it is necessary that they be protected both from excessive sun-shine and rain. When the plants stand singly in the borders, it is more difficult to provide sufficient shelter for them, than when they are in beds, or in pots, where they can be either covered with a canvas awning, or the pots removed under shelter. Florists use for those which stand singly small tin caps, in form of an umbrella, and from six to ten inches in diameter; each cap is furnished with a square tube on the summit, through which the stick that supports the plant is passed and made fast by a wedge, or often by a nail, which passes through the side of the tube and into the stick, which secures the cap at any distance from the flower which may be selected. Where carnations are cultivated on a large scale, it is better to have them in one bed or beds, where they can be protected by an awning of canvas, supported over them sufficiently high to admit the owner to walk freely underneath, which awning can be drawn up and down, as occasion may require, by means of pullies and lines. Those that cultivate florists' flowers should not be without such frames, for they serve the purpose of sheltering the early

blooming *hyacinths*, *tulips*, *ranunculuses*, and *anemonies*; and when those flowers are over, they come into use in the protection of carnations and pinks. There are few cultivators of this flower who do not prefer having their plants in pots, as being more portable and less subject to accidents, arising from various causes, of which the carnation is peculiarly impatient.

Those who are high in the fancy, approve of stages about fifteen or eighteen inches high, on which to stand the plants, in order that they may be seen to greater advantage, as being brought nearer to the eye. These stages should be made very strong, as the weight of pots that they may have to sustain will be great; and in order to prevent the intrusion of *earwigs*, which are very destructive to the flowers of carnations, they place the posts or supporters of this stage into pans of water. If the bottoms of the posts be painted over every four or five days with oil of the coarsest quality, no insects will ascend by them. Oil, in all shapes, is destructive to insects, and the least drop of it applied to the backs of most of them, proves instantly fatal.

Florists attach great mystery to the cultivation of their favorite flowers, and it cannot be denied that they follow many very absurd and ridiculous customs, such as the preparation of their composts; the numerous ingredients, of which many of them are composed, are at decided variance with each other, and with common sense. The perfection of a florist's flower is one of his own making, as if Nature herself were deficient in this important point, or that he himself were superior in judgment to Nature herself. Hence the variance which has always subsisted between the florist and the botanist, who admires Nature as she really is, and treats the pampered production of the other as a monstrosity.

> " ——————— Who can paint
> Like Nature? Can imagination boast,
> Amid its gay creation, hues like her's?
> Or, can it mix them with that matchless skill,
> And lose them in each other, as appears
> In every bud that blows?"

CRITERION OF A FINE CARNATION.

A celebrated florist gives the following as the criterion of a fine carnation: "The stem should be strong, tall, and straight, not less than thirty nor more than forty-five inches high. The foot-stalks supporting the flowers should be strong and elastic, and of a proportioned length. The flower or *corolla* should not be less than three inches in diameter, consisting of a great number of large well-formed petals, but neither so many as to give it a crowded or too full appearance, nor so few as to make it appear too thin and empty. The *petals* should be long, broad, and substantial, particularly those of the lower or outer circle, commonly called the guard-leaves; these should rise perpendicularly about half an inch above the calix, and then turn off gracefully in a horizontal direction, supporting the interior *petals*, and altogether forming a convex and nearly hemispherical *corolla*. The interior *petals* should rather decrease in size as they approach the centre of the flower, which should be completely filled with them. The *petals* should be regularly disposed alike on every side, imbricating each other in such a manner as that both their respective and united beauties may captivate the eye at the same instant. They should be nearly flat; however, a small degree of concavity or inflection at the *lamina* or broad end is allowable, but their edges should be perfectly entire; that is, free from notches, fringe, or indenture. The *calix* should be at least one inch in length, terminating with broad points, sufficiently strong to hold the narrow bases of the *petals* in a close and circular body. Of whatever colour the flower may be possessed, they should be perfectly distinct, and disposed in long regular stripes, broadest at the edge of the *lamina*, and gradually becoming narrower as they approach the *unguis*, or base of the *petal*, then terminating in a fine point. Each *petal* should have a due proportion of white; for example, one-half, or nearly so, which should be perfectly clear and ree from spots."

"*Bizarres*, or those which contain two colors upon a white ground, are esteemed rather preferable to flakes, which have but one, especially when their colours are remarkably rich and

very regularly distributed. Scarlet, purple, and pink, are the three colours most predominant in the carnation. The two first are seldom to be met with in the same flower, but the two latter are very frequently found.

"Where the scarlet predominates, and is united with a paler colour, or, as it sometimes happens, with a very deep purple upon a white ground, it constitutes a scarlet bizarre, of which there are many shades and varieties; some richer and others paler in their colours, as is the case with all the rest. Pink bizarres, are so called when the pink abounds; purple bizarres when the purple abounds; crimson bizarres consist of a deep purple and rich pink.

"When the pink flake is very high in colour, it is distinguished by the appellation of a rose-flake; but there are some so nearly in the medium between a pink and scarlet, that it can scarcely be defined to what class it belongs." To these varieties may be added picotees, which are highly esteemed by some cultivators, on account of being hardier than the generality of carnations, and are therefore desirable for the flower borders; independently of which, they are of themselves very beautiful, and are distinguished from the others, their colours being principally yellow and white spotted, while the others have their colours in stripes. Their cultivation and propagation are similar to that laid down for carnations.

The enemies which annoy the carnation, are earwigs, slugs, green-fly, above the surface of the ground, and that destructive insect, the wire-worm, beneath it. The three former are easily destroyed, by following the directions already laid down in the foregoing parts of this work; but the latter is not easily got rid of, except by carefully searching for it in the ground, which cannot ever be carried to any great extent. When it makes its appearance in pots, it may be readily detected by turning out the mould and potting the plants in fresh compost.

Pinks not being so tender in their nature as carnations, they are brought to great perfection with much less trouble, and are seldom cultivated in pots to any great extent. However, the choice kinds of pinks in beds should, during their season of blooming, be protected by a screen similar to that used for carnations, to protect them from the sun and heavy rains,

which would much injure their colours and hasten the decay of their flowers. Those which seem disposed to burst, should be assisted as already directed for carnations, and neatly tied up to sticks to support the flower.

CRITERION OF A FINE DOUBLE PINK.

Florists consider that a fine pink should not be less than twelve inches in height, having a stem strong, elastic, and erect; that the *calix* should in form and proportion be like that of the carnation, but of course smaller; that the flower in its formation should also agree with the formation of that flower, and be not less than two inches and a half in diameter. The *petals* should be large, broad, and substantial, and finely fringed or serrated round their edges, but not so much so as to appear in deep notches or indentures. The finer the fringe is, the nearer they approach to perfection; and those are considered the finest which are perfectly entire, or what florists term rose-leaved, that is, without any fringe whatever. The broadest part of the *petal*, that is, the part farthest from the eye, should be perfectly white, and distinct from it, unless it be a laced pink; that is, one which is so called from its being ornamented by a continuation of the color of the eye round it; bold, clean, and distinct, leaving a considerable portion of white in the centre, perfectly free from any tinge or spot. The eye should be equal in proportion to the white, or nearly so, and the darker it is the better. Bright or dark rich crimson or purple, resembling velvet, is esteemed, but the nearer it approaches to black, the higher it is prized.

SOWING MIGNIONETTE FOR WINTER AND SPRING USE.

Mignionette has long been a popular flower; the agreeable fragrance of its bloom has long insured it a place in our gardens and rooms. During summer it is a plant of the easiest culture, and will grow in any soil or situation; like all other aromatic plants, its fragrance is most powerful when grown in light barren soil, fully exposed to the sun. To have it in perfection during winter has long been considered a deside-

ratum, and the London nurserymen have tried various plans to procure it during that season. It is an article of considerable importance to them in a commercial point of view; some of them, such as Colvil, having not less than from one to five thousand pots annually fit for sale from November till April.

Those who cultivate this plant for the London market, sow the seed at different times, from the result of a long experience, and they fix the times of sowing to correspond with the time they expect a demand for it. To obtain plants in bloom during the months of January and February, they sow in the open ground about the end of July, sowing the seeds thin, that the plants may be stocky. By the middle of September these plants will be fit for potting. They choose pots of various sizes, those of the sizes called thirty-two's are the most convenient; into these pots they plant from eight to twelve plants, thinning them out afterwards, should they be too thick. The mould of which they make use is rather light and porous, admitting the water to pass freely through it. After potting the plants, they are placed into a cold pit or frame, and shaded for a few days until they have fully established themselves; after which, they are exposed to the weather, without any protection, except from dashing rains, till November. By the first of that month they are showing flowers, and should then be removed into the green-house, conservatory, or drawing-room, where they will continue to flower during the whole of the winter. A second crop is sown not later than the 25th of August, which comes into perfection in March, April, and May.

This crop is sown in the pots where it is to remain, and plunged in any dry border, or placed upon a bed of coal-ashes, as they cannot be injured by the weather while young. In November this crop is thinned, leaving eight or ten plants in each pot, and at that time are covered with a frame, and the glasses put on during night and in cold or snowy days, taking care that they sustain no injury either by frost or rain. To prevent the pots from being broken by the expansion of frost, as well as to protect the roots, they are plunged in rotten tan, if not already plunged; but when the weather is so severe as to freeze the mould in the pots, even slightly, the

sashes should be covered with mats. The crop for the spring supply should be sown not later than the 25th of February, and will come into perfection by the middle or end of May. This sowing should be placed on a gentle heat, which should be kept up by renewing the linings as the heat declines.

There is a variety called the tree-mignionette, which is much sought after, and is propagated from seeds sown in spring, and also by cuttings, which strike root without much difficulty. When sufficiently rooted, if from cuttings, or if from seeds and strong enough, they should be potted into small pots, and forwarded with a little heat. As the plants advance, they should be trained to a single stem, displacing all lateral shoots as they appear, but taking care not to injure the leaves upon the stem which draw nourishment to the plant. When this stem has attained a height which is deemed sufficient, the lateral shoots are then allowed to grow from it, near the top, and as they extend themselves, they should be frequently stopped by pinching their points off, so as to form a bushy head. By autumn, the plants will have attained the shape of a tree in miniature, and will be covered with bloom. As the plants increase in size, they should be once or twice shifted into larger pots; however, leaving them, when full grown, in pots of the size called small thirty-two's. By a similar mode of treatment, plants of the common mignionette will attain the same habit; and if kept in training, by continually pinching the shoots and keeping the plants rather dry, they may be kept for several years. We have more than once had plants of mignionette in this way four years old, and have been assured by a botanical friend that he has had a plant, similarly treated, remain in perfect health seven years.

AUGUST.

PLANTING EVERGREEN TREES AND SHRUBS.

This is a season when most evergreens may be removed with success, particularly if the weather should be moist; if not, recourse must be had to the watering-pot and garden-engine. Box edgings and evergreen hedges may also now be cut or trimmed, if not done last month. Large evergreens may also be headed down, and all that are in want of pruning may now be done with propriety.

PROPAGATING EVERGREEN SHRUBS, &c.

Evergreen shrubs are propagated by layers, cuttings, &c. To obtain handsome specimens of these, as well as of all other trees and shrubs, we have already observed that propagation by seeds is to be preferred. However, for many purposes for which evergreens are used, such as forming underwood in plantations and cover for game, plants originated by laying or from cuttings are generally used. At this season, cuttings may be successfully put in, but the sooner in the month the better, that the plants may be rooted before the approach of winter; for this purpose, cuttings of the young wood should be planted in a shaded situation, in beds of common garden-mould, and as thick in the bed as convenient to plant them. The cuttings should not be shortened, neither should any of the leaves be taken off nor shortened, unless such as would be buried in the ground. The cuttings may be from a foot in length, or longer, to three or four inches, according to circumstances; and being well fixed in the mould, and occasionally watered, will soon emit roots, and be by this time next year in fit order to plant out into nursery-lines, to attain a size fit for planting out where they may be afterwards required.

PROPAGATING HERBACEOUS PLANTS.

Herbaceous plants are propagated by seeds, cuttings of the stems and roots, and by splitting or dividing them into smaller pieces. Propagation by seeds and by cuttings of the roots, are performed generally in spring, in order that the young seedling-plants may attain a sufficient size the first year of their growth, to enable them to withstand the approaching winter; and propagation by cuttings of the roots is performed at that season also, as soon or immediately before their vegetating powers become affected by the natural influence of the season. Propagation, by cuttings of the stem, may be performed at any period after the plant has nearly attained its full size, till it becomes too hard and dry; after which time the success will be less certain. Almost all herbaceous perennial plants can be propagated by this method; and to increase any scarce species, it is certainly of all methods the most certain and expeditious. Propagation, by dividing at the roots, is often performed, and may be practised at any season of the year upon many plants; those that are of evergreen and diminutive habits in particular. Those which attain a large size are less calculated for this mode of propagation during their season of growth; but from the time that they begin to decay in autumn, till they have begun to grow again in spring, they may, with the greatest safety, be divided, and almost increased at pleasure.

CARNATIONS AND PINKS.

Carnations and pinks may still be propagated by laying and piping, but the sooner it be now done the more strong will the plants be before winter. Carnations laid last month, should be looked over, as many of them, and by far the greater part, will have struck root sufficiently to warrant their being separated from the parent plants. The finer kinds will require, for their greater safety, to be potted in small pots, one plant in each, in the size called large sixties, or small forty-eights; and as soon as they are potted they should be moderately

watered, and placed in a shaded place, till the season approaches, when they will have to be placed in frames for their winter habitation. Those which are less valuable, are generally called border flowers, and those planted in our flower gardens, should, when fully rooted, be also taken off, which they will be in from four to six weeks after laying, and planted in beds in a warm border, or other well-sheltered place, at five or six inches apart, or more, according to their size, where they are to remain till planted out in the flower borders, either in autumn, or with greater success in spring.

Pinks propagated by pipings last month, should also be looked over; and if sufficiently rooted, they should be taken up and planted in a sheltered situation in nursing-beds, five or six inches apart, in which they are to remain until they are planted out in the flower borders. Such pipings as may not yet have made sufficient roots, should be, as often as they require it, supplied with water and kept clear of weeds.

AURICULAS.

Auriculas in pots, of the finer kinds, or such as are planted in the flower borders, the offsets of which were not taken off in May, may now be done, and the finer or scarcer sorts potted in pots of the size called large sixties, or small forty-eights, where they will remain till spring, to be potted off into larger ones. The more common kinds, when taken off, may be planted in beds in the reserve garden, and attended to with water and shade for a few weeks, when they will be sufficiently established to be either planted out or left till spring.

ALPINE PLANTS IN POTS.

The collection of Alpine plants in pots should be gone over, and any of the more rare divided, if done flowering, to increase the stock. Those which have perfected their seeds, or which are in progress of perfection, such as the families of *Draba*, *Arabis*, and indeed most of the plants of

the natural order of *Cruciferæ*, should be carefully watched, that their seeds may be saved, and a part of each species immediately sown; the remainder to be saved till spring, in order to ensure a more positive success. Such plants freely perfect their seeds with us, and their propagation by other means is not so convenient.

Plants of the natural order of *Saxifrageæ*, and those which are allied to it in *habit*, readily propagate by dividing the whole plant; and most of them will increase by such means, whether each piece be furnished with roots or not. Weeds should be carefully eradicated, and great attention paid to render the atmosphere round them both humid and temperate at this time, when we have generally our hottest weather: this is only to be effected by water, freely and judiciously applied to them, and a regular and sufficient degree of shade; but, as we have already observed, they should not be placed under the drip nor the shade of trees.

TRANSPLANTING SEEDLING PERENNIAL AND BIENNIAL PLANTS.

Such plants as may have been originated from seed, of the above denominations, if sufficiently strong, may be safely transplanted out of the seed-bed into nursery-beds; or many of the strongest plants may be removed at once into the situations where they are ultimately to remain.

Advantage should be taken of moist days for this operation; but if such should not occur, recourse must be had to the watering-pot and shading, which must be continued until rain comes, or until the plants be sufficiently rooted.

GATHERING FLOWER-SEEDS.

Flower-seeds, whether annual, biennial, or perennial, should be now carefully gathered as they ripen, where the intention is either to propagate rare or curious species, or for the purpose of sale. As each species ripens, they should be carefully collected and deposited in bags, if the quantity be considerable; but if small, into small paper packages. In the former case,

having the name carefully written on a wooden or paper label, and put into the bag for greater certainty. Upon the outside of each bag the name should also be written, for the greater convenience of ascertaining the different sorts. Those which are in smaller packages should have their *generic* and *specific* name also written upon the outer side of each packet. As they are collected, and when sufficiently dried, they should be laid by in the seed-room, or other dry place, till the season of sowing; however, they should be occasionally examined, to see that none have been laid by in a damp state, which, if not detected, would soon destroy the vegetative powers of the seeds.

The saving of flower-seeds is seldom carried to any extent in the gardens of private individuals, neither would any return be adequate to the expense and trouble of collecting and curing, as the generality of them can always be purchased much cheaper than they can be grown and saved. We here, however, allude to such kinds, as are either curious, rare, or interesting to the owner or manager of the garden; indeed, the cultivator, who is high in the fancy of cultivating rare or curious specimens, or of promulgating many varieties of certain species, will always find ample employment at this season. The production of hybrids or mules is a favorite pursuit of many; and this is attained by bringing the fertilizing dust of one plant in contact with the feminine pollen of another. The progeny thus produced often, in some species, participate of the characters of both, and those seed-vessels which may have been thus operated on, should be distinctly marked when gathered, and their future merits ascertained.

SEPTEMBER.

TRANSPLANTING FLOWER GARDEN PLANTS.

Those plants which may have been originated from seeds, cuttings, or by other modes of propagation, may now be planted out; the strongest where they are to remain to bloom, and the weaker or superabundant ones into nursery-beds, to gain strength, and to serve as a reserve-stock for future supplies. Advantage should be taken of moist days for this purpose; indeed, it is in all cases better to defer planting a few days, than to plant when the ground is too dry and the sunshine powerful; no artificial watering is equal to the watering of nature.

PROPAGATING HERBACEOUS PLANTS.

Continue the propagation of these plants either by the process of the division of the roots, or by sowing seeds which have been saved during the season. Some of the more rapid growing sorts may be propagated by cuttings, but the sooner in the month that this operation is performed the better, in order that the plants may be sufficiently rooted before vegetation ceases. Such plants as may be out of flower, and whose flower-stems are decaying, may be divided at the root; and, if sufficiently strong, planted out, where they are permanently to remain.

PLANTING BULBOUS ROOTS.

Towards the end of this month, beds should be got ready for the reception of *hyacinths*, *tulips*, *ranunculuses*, *anemonies*, &c., where they are to be planted in masses. For this purpose, the ground should be dug or trenched two feet deep, breaking the mould fine, and laid out in breaths of convenient dimensions. When the beds are ready, the roots should be planted in lines across, and at depths according to

the kinds planted; the two former requiring to be planted deeper than the two latter. It is always better, in planting bulbs, to plant them too shallow than too deep, as it can be remedied, if they be too shallow, at any time, by surfacing the beds with a portion of prepared mould; whereas, if they be too deeply planted, they cannot be so safely uncovered of the superabundant mould, without endangering the buds of the bulbs.

Where bulbs are to be planted in patches, or singly, in the borders of the flower garden, the spots being marked out, should be loosened up to the above depth, particularly if the soil be strong and adhesive; but where of a sandy light texture, one foot will be sufficient. In the former case, a portion of vegetable mould or sharp sand should be added, to correct the stiffness or adhesiveness of the soil. When planted, neat pegs should be placed in the centre of each patch, to serve as a guide in digging or hoeing the ground afterwards, or until the plants come up, that they may not be destroyed.

CARNATIONS AND PINKS.

The layers of carnations, and pipings of pinks, that may not have been removed from the parent plants or from the hand-glasses where they have been struck, should now be taken off early this month; if not done before the end, it will be safer to let them remain where they are until the spring.

AURICULAS IN POTS.

Towards the end of the month, the finer auriculas in pots should be removed to their winter habitation, either into the stage-frame or into some dry airy and warm situation, where they can be protected during the winter with frames and glasses; for, although the auricula, *Primula auricula*, be a native of the central parts of Europe, and in altitudes considerably affected with cold, still those varieties, produced by long cultivation, are as much altered, in regard to their natural hardihood, as they are improved by the fostering care of the florist. They will withstand well a considerable degree of dry cold, but cold accompanied with wet will soon destroy them.

Until the month of November they need not be constantly covered, but only protected occasionally from heavy rains, or similar injury. As their leaves decay round the bottom of the stem, they should be carefully removed, as they tend to engender mouldiness and decay. The surface of the mould in the pots should also be frequently and carefully stirred, but not deep, for fear of injuring the roots which are nearest to the surface. A few small pebbles, sand-stone chips, or oyster-shells, placed on the surface of the pots, will greatly tend to prevent dampness, which is all that has to be guarded against in the cultivation of this charming flower at this season, and until vegetation commences in spring.

ALPINE PLANTS IN POTS.

Many of the more delicate Alpine plants should now be placed in the Alpine pits or frames, where they are to be wintered, as the season is now approaching when damp and a superabundance of rain cannot be otherwise guarded against. Damp is certain destruction to most plants which are natives of barren or rocky situations, and those in a state of cultivation are more liable to its ill effects, than those which are in their native soils. Cultivation produces an enlargement of parts, which enlargement is made up of matter extremely liable to decay, particularly when in close and humid situations.

It will now be necessary, therefore, to place the more rare, and such as are likely to be injured by much damp, in the frames; but here they should not be covered, unless in times of rain, for if they be covered they will be drawn up weakly, and their vegetative powers excited at a season when they should be at rest. Those which are less delicate, when they appear too damp, should be laid over on their sides to drip until they be dry, and then to be replaced in an upright position. Worms will now be troublesome to them, and to all plants in pots; they can be easily destroyed by watering the whole over with lime-water, or the pots in which they appear to be, inverted, and the plant taken out with the ball entire, when in most cases the worms will be detected, scarcely covered with mould. Those who are partial to these humble

and interesting plants, will not consider it a task to watch over their welfare from this time till the return of spring, when their attention will be amply repaid by the elegance, the perfection, and simplicity of their varied blossoms.

TRANSPLANTING PERENNIAL PLANTS.

Continue to transplant into the borders where they may be required, all herbaceous plants propagated during the season, as they become sufficiently strong, but those which are not now sufficiently stout should be left till spring; for, if they be now planted, they might not be sufficiently established before the winter, unless the autumn should be mild.

Those herbaceous plants which may have finished flowering, and may have overgrown the bounds prescribed for them, may be divided or reduced in size, and planted out, where they are to remain.

TRANSPLANTING FLOWERING SHRUBS.

Many hardy deciduous flowering shrubs may be planted by the end of the month, particularly such as may have by that time shed their foliage or finished their year's growth. From that time, till the end of March, this operation may be safely performed if the weather permit.

Shrubs for particular purposes, which have been planted by the end of this month, or perhaps earlier, should have repeated waterings given them, both at their roots and over-head, particularly if the season be dry and the soil light and sandy. By this early planting, under favorable circumstances, the plants will take root this autumn, and go on in spring, as if they had sustained no check.

PLANTING EVERGREENS.

Evergreens may be now planted, observing, if the weather be not showery, to give copious waterings at their roots, and also over their tops, by applying water from the garden-engine two or three times a-week, preferring the afternoon or evening for that purpose.

GATHERING FLOWER-SEEDS.

Continue to watch the ripening of all sorts of flower-seeds which it may be desirable to propagate in quantities, as well as those which are only annual or biennial. From a want of due attention being paid to this simple practice, our lists of cultivated biennials are small when compared to the number that exist, and that have been introduced into the country. Many interesting and beautiful plants belong to this denomination, that would be an ornament to our gardens.

A reference to the British Flower Garden, published by that indefatigable botanist, Mr. R. Sweet, will exhibit a striking proof of the truth of the above assertion, as great attention has been paid to figure most of the biennial plants recently introduced, and may be considered the chief stimulus for their rapid introduction into all the best gardens of the kingdom. Many of these, however, do not freely perfect their seeds with us in the open air, a little assistance is therefore necessary, on the part of the cultivator, to perpetuate his favorite species; and this can, in most cases, be completely effected by protecting some with hand-glasses after the flowers begin to fade, and the culture of a few others of the most tender in pots, where they may be taken into a pit or frame for a similar purpose.

OCTOBER.

PLANTING DECIDUOUS SHRUBS AND ORNAMENTAL TREES.

Trees and shrubs of all sorts may be successfully planted from this time till the end of March, avoiding frosty weather; and ground intended to be planted should now be got ready by trenching, &c.

PLANTING EVERGREEN TREES AND SHRUBS.

The planting of evergreen trees and shrubs may be proceeded with successfully, attending to the directions already given, in watering and supporting them, particularly those which are of considerable size, in order that the winds of autumn and winter may not blow them about, which will completely prevent them from making fresh roots, or destroy those which are in the process of being made. Each tree should, immediately after planting, be neatly and firmly supported, by placing one or more stakes in the ground, and inclining them inwards to its stem or to its principal branches. To prevent the friction from destroying the bark, pieces of old matting or pads of hay-bands should be used to place between the tree and the supports; these should be firmly tied with new tarred cord, in order to keep the whole steady; but, notwithstanding this support, they should occasionally be gone over and examined, that they may not be loosened at their root, as well as that the supports do not press too much upon the stem of the trees, by which the bark would be injured. As each tree is planted, it should have a potful of water given it at its roots, or more or less, according to the size of the tree and moisture of the ground.

PLANTING HERBACEOUS PLANTS.

Herbaceous plants may now be planted either from the reserve garden, or such plants as have overgrown their allotted

spaces may be reduced in size, and the pieces taken off and planted out where they are to remain.

PLANTING BULBOUS ROOTS.

Any time this month, bulbous roots of all kinds may be planted with success. Those who cultivate these flowers to a considerable extent, either for amusement or profit, have different seasons for planting, so as to prolong the season of flowering to a greater length of time. But, for general purposes, October, November, February, and March, are generally chosen.

Bulbous-rooted plants differ in their mode of cultivation from most other plants, inasmuch as the majority of plants, when once planted, remain to occupy the same space for some length of time, some for years and others during their lives; whereas bulbs, for the most part, require to be taken up once every other year, and all the most valuable ones, annually. The reason assigned for this difference of cultivation is, that most bulbs multiply exceedingly fast, that is, great numbers of young bulbs originate under ground, from the sides of the parent bulb, and in a short time would send up a superfluous number of stems, much more than could be properly nourished on the area on which they grow; and these would, as a consequence, choke each other, and finally decay. Other species of bulbous-rooted plants form their young bulbs under the parent one, and thus, in the course of a few years, recede so far from the surface, that they are unable to penetrate through the depth of mould over them, and, as a consequence, cease to appear; while others, which form their new bulbs over the parent ones, at last come above the surface, and are killed by frosts, droughts, and other causes.

Florists, who are the best managers of these matters, take up their most valuable varieties annually; and the superintendants of flower gardens content themselves with taking up the least valuable, or what are termed border-flowers, once in two, three, or even four years, unless the place occupied with bulbs be intended to be occupied with something else during their season of inactivity.

All bulbs may be with propriety taken up when their leaves wither and decay, but not sooner; for, if a bulb be disturbed while its leaves are making, or before it shows evident signs of being ripe, it is very much injured, and often entirely killed. The leaves of all plants serve most essential purposes, and the health of the majority of plants is affected, more or less, when these are either destroyed, taken off, or injured, and the bulbs, in a particular degree; for, if these be taken off, or even much injured, or the bulb transplanted without sufficient care, so that no check be given to its growth, the bulb will be so much injured that it will not be in a fit state to flower the succeeding year, or probably for the second or third following.

The exact time that bulbs should remain out of the ground is difficult to determine; we not unfrequently see bulbs prosper well which are taken up one day and planted the next, while others of the same species may be kept out of the ground for months, and little difference is seen in the strength or beauty of their flowers.

The object which cultivators have in view, generally, in removing bulbs for a time from the ground, is, first, to separate the young or small ones, for the purpose of propagation, and to facilitate their being planted at more regular distances; and, secondly, to set the bulbs more completely at rest, and thereby render them considerably more excitable when again planted.

Some bulbous-rooted plants propagate so rapidly, as, for instance, some species of *Ornithogalum*, *Scilla*, *Muscari*, *Oxalis*, *Allium*, and *Iris*, by throwing out so many young bulbs, that they really cease to send up flower-stalks. To remedy this evil, they should be annually taken up, their young bulbs removed, and the parent, or some of the strongest ones, planted singly, where it is desirable that they should flower; or, by sacrificing the offspring, by destroying the young leaves as they appear, the old bulb will send up its flower-stalk annually. Where the object is rather to increase the bulb for flowering than the propagation of the species, the young bulbs should be destroyed as soon as they are known to exist, which will be determined by their sending up young leaves; these young bulbs should be destroyed or displaced by clearing

away the mould carefully from round the parent bulb with the hand, and with a blunt stick, or other such instrument, removed, so as not to injure the parent bulb.

By thus sacrificing the young plants, most of that nourishment which would have gone for their support, at least while young, will be diverted into the parent bulb, and will be the cause of its flowering much stronger the same season, and of collecting additional strength for that of the succeeding one. Florists, where the saving of seeds is not an object, always pinch off the flower soon after it begins to decay, so that it may not tend to rob the bulb of an unnecessary degree of food.

The method of propagation by dividing the roots, is, by separating the young offsets from the parent; bulbs are also propagated by seeds, but this is chiefly done with a view to obtain new or valuable varieties, and is chiefly the province of the amateur florist. Cultivators, in general, being content to purchase new varieties of them, employ no other mode of propagation but that of separating the bulbs.

Bulbs in general succeed best in a light rich sandy soil; but those who are high in the fancy of bulb growing, employ strange mixtures for their best beds of flowers. Each sort of bulb they consider requires a soil peculiar to them. We will not enter into the detail of those soils and mixtures recommended by those who make the flowering of a *tulip* or a *hyacinth* a subject of mystery, being perfectly convinced that all their boasted properties, when once exposed, will be found of little value. The rational cultivator will be content to employ much fewer and more reasonable ingredients in the preparation of his beds.

HYACINTHS.

For the cultivation of this flower, the Dutch have long been notorious, and probably in the first instance as a matter of amusement, have for many years made the propagation of the hyacinth a considerable article of commerce. It appears, that double hyacinths were not known until the beginning of the last century; for, before that time, single ones only were grown. The first double flower of this kind is said to have

been originated by Peter Voerhelm, but it is now lost. The same individual soon after raised the variety called the king of Great Britain, which was long sold for the sum of one hundred pounds sterling, a great price in those days, and is supposed to be the oldest variety of double hyacinth in existence. Instances have occurred of the price of one bulb being as much as two hundred pounds; such prices, however, are not now given, the taste for bulbs having in a great measure given place to plants of a different description.

In the cultivation of this flower, the Dutch still excel us, and supply us annually with dried bulbs, which are sold by the nurserymen, the more common kinds at from forty to sixty shillings per hundred, the better sorts at from one to ten shillings per root, and there are only a very few of the most rare that are rated at more than ten pounds per root.

Some of the Haerlem florists, who are the most noted in Holland, use a soil for their best bulbs comprised of the following ingredients.

Two sixth-parts of grey sand, not sharp, but handling smooth and a little greasy, two sixth-parts of well-rotted cow-dung, one-sixth of tanners' bark that has been used in the forcing-houses, or otherwise rotted to mould; one-sixth vegetable mould of well-rotted tree-leaves. These materials are mixed and blended in a fully-exposed place, often turned over, so that all parts of it may be well and equally exposed to the rays of the sun, and when used, it is well broken with the spade, but never sifted, which, they justly observe, would render it less porous, both for the free filtration of water as well as for the more ready penetration of the fibres.

They calculate that soil thus prepared will last about six or seven years; they do not, however, plant hyacinths in the same bed two successive years, but use such beds for other bulbs in the alternate years, nor do they plant hyacinths in this compost the first year after its preparation, for fear of their being injured by the fresh manure.

Soils have been formed of materials as nearly corresponding to those above as could be attained, but the success of our cultivation in this country has never equalled that of the Haerlem cultivators. With us many varieties degenerate in

two or three years, but the Dutch gardeners have preserved them for nearly a century.

In making up their beds, the Haerlem florists choose a sheltered situation, exposed only to the south; and, in the formation of them, they excavate the natural soil to the depth of two feet, the whole length and breadth of the bed or beds; this being removed, they then dig and finely break the mould in the bottom of the bed to the depth of nine or twelve inches more. This space they fill with the above compost, and sometimes with the following:—One-third coarse sea or river sand, one-third fresh sound earth, one-fourth rotten cow-dung, completely reduced to mould, and vegetable mould, of decayed tree-leaves, for the remainder. They mix and incorporate these ingredients, and about a fortnight before the bulbs are to be planted, they fill up the bed with the compost to about four inches above the level of the natural ground, on the south-side, and about ten inches above it on the north side, so that the bed, when finished, will present an inclination to the sun, and admit of all superfluous water passing off.

Their season of general planting is from the middle of this month to the middle of the next, and is performed in the following manner:—Before planting the roots, the surface of the bed is covered with a thin layer of sandy earth raked smoothly over it, on which they mark out, with great regularity, the exact situation of each bulb. Round, and under each root, they place a little clean sand, which prevents the mould adhering too closely to them. The whole being planted, they cover the whole surface of the bed to the depth of three or four inches with fine sandy mould, leaving the bed, when finished, about eight inches above the ground-level in front, and fourteen inches behind. In the disposal of the bulbs in the bed they are at much pains, mingling the colors so that they may produce an agreeable and striking contrast.

HYACINTHS FOR FORCING.

This is a good time to pot these bulbs for being forced during the winter and early in the spring; for this purpose, narrow deep pots should be procured, which should be filled

with light rich sandy mould, into which the bulbs should be planted about half, or rather more, of the bulb being under the mould. When the bulbs are large and sound, one may be enough for one pot, but if they be small, and apparently weak, two or three may be placed in each pot. When planted, the whole should be placed on a dry level surface, and covered, to the depth of six or ten inches, with decayed tanners' bark, rotten leaves, or fine sand. They will, in such situations, soon emit fibres, and the pressure of matter above them will prevent them from being forced out of the pots, which would in many cases occur if they were not thus covered. From this situation they are to be taken as wanted, and placed in a slight bottom-heat in frames or pits; taking the first set into heat, say in November, and they will be fine in bloom at Christmas.

PLANTING HYACINTHS IN THE FLOWER BORDERS.

The more common varieties of hyacinths, which are to be planted in the borders of the flower garden, will succeed well if planted at this season, where they are to remain to flower. The only preparation that is necessary for them is to loosen the spot where each patch of two or three bulbs is to be planted, to the depth of a foot. If the soil be strong and damp, a little sea or river sand may be added to it, to render it more light; but, in any ordinary good flower garden soil, the more hardy varieties will succeed perfectly well.

PLANTING TULIPS.

According to our previous observations respecting hyacinths, the Dutch have also been long celebrated for their skill in the cultivation of the tulip. This flower, although it reached this country probably nearly as soon as it reached Holland, still our earlier gardeners did not attend to its cultivation with that enthusiasm which characterized their neighbours on the continent. It is supposed to have reached Europe in 1559, and we are informed that it was cultivated in England so soon after as 1577. It became an article of considerable trade in the Netherlands about the middle of the seventeenth century; and to

such an extreme was a love for this plant carried, that between four and five hundred pounds have been given for a single root. A Scotchman, it is reported, was once so enraptured with it, that he resided for a long time at Rome, in an uncomfortable dwelling, to enjoy his passion for this flower; and to such an extreme did he carry his care of them, that he is said to have placed two fierce dogs as guards over his tulip beds.

Tulips, like all other bulbous-rooted plants, like a deep, rich, light sandy soil, but they will grow very well in most ordinary garden soil that is not too damp nor heavy. The tulip growers make choice of an open airy situation for their principal beds; and Hogg of Paddington, an enthusiastic cultivator of this flower, recommends a soil of a fresh rich sandy loam, which has been at least twelve months dug and exposed to the air previously to using, moderately enriched with well-rotted dung. In forming the beds, florists excavate the natural soil, the whole length and breadth of the intended bed, to the depth of twenty inches or two feet, which they fill up with the prepared mould, leaving the bed when finished somewhat convex. Upon the bed, finished in that manner, they mark, at regular distances, about seven inches apart, the situations for the bulbs, which are planted from two to three inches deep.

RANUNCULUSES AND ANEMONIES.

In dry light soils, ranunculuses and anemonies may be now planted, but in soils and situations which are wet and cold, it is better to defer planting till the end of January or the beginning of February. Where these flowers are cultivated in beds, soils may be formed suitable for them, and in such case, this month or the following is the best time for their planting, as the roots will have more time to vegetate and form themselves, and will generally flower stronger than those which are planted later in autumn or early in spring. Florists prefer a soil much stronger for their beds of *ranunculuses* and *anemonies* than for any of their other flowers. A correspondent in the Hort. Trans. uses a stiff clayey loam, with a fourth-part rotten dung. The bed, he recommends, should be prepared to the depth of eighteen inches or two feet, and not much

elevated above the ground-level, that it may the better resist the drought. In forming the bed, a stratum of well-rotted cow-dung should be placed about five inches under the surface, and well mixed with the mould below that depth; but the earth above this stratum, into which the roots are to be planted, should be kept perfectly free of dung, which would be injurious rather than otherwise to the roots of the plants. The fibres of the plants, which are the organs that collect nourishment, will derive sufficient support from the dung at this depth, but if placed deeper would be out of their reach, and would not receive so much advantage from the air, which is held to be of much consequence.

The roots should be planted in lines, either across the bed or longitudinally, and be not planted deeper than about two inches, and about five inches distant from each other, or less if the roots be small. The better way is to draw drills of that depth, into which the roots should be placed, sprinkling a little clean coarse sand into the drill previously to placing the roots in it.

JONQUILS.

These flowers will succeed well in a soil similar to that above recommended for ranunculuses and anemonies. They should be planted five or six inches apart, and about three inches deep. As jonquils do not flower so well the first season after planting, they are therefore generally left in the ground for three, four, and even five years, without being taken up.

BULBOUS IRISES.

The earlier in the month that bulbous Irises be planted, the stronger will they flower the following summer; those which are not planted till spring or late in autumn, seldom flower well, if at all, the season following. They should be planted (if in beds) at eight inches or a foot apart in light rich earth. Bulbous Irises are not taken annually up, once in three or four years being considered the better practice.

NARCISSUSES.

A light sandy soil is well adapted for the cultivation of these flowers, moderately enriched with very old cow-dung. As they do not flower well the season after planting, they are therefore seldom taken up oftener than once in four or five years, and that only to separate the bulbs which they may have made. The earlier in the month that they are planted the better.

LILIUMS.

All the species of this beautiful family deserve a place in the flower garden; the more common sorts, such as the *L. candidum*, *L. bulbiferum*, *L. martagon*, &c., will grow in almost all situations and soils in the flower borders, or in the shrubberies even under the shade of trees. The more valuable species, such as *L. canadense*, *L. japonicum*, and *L. philadelphicum*, require more attention, and will repay any care that may be taken of them by the beauty of their flowers. These are rather tender to stand out with safety in our flower borders during the winter; they should, therefore, be planted in the most favorable situations, and protected during winter with a hand-glass, as well as the surface of the ground round their roots covered with coal-ashes, to resist the effects of damp and also to exclude the frost; or they may be planted in deep pots, known by the name of bulb-pots, and removed during winter into the green-house or into pits. But bulbous plants of their size seldom flower so well in pots as when planted out, for want of sufficient scope for their fibres, which extend themselves much beyond the limits of ordinary-sized pots. Some cultivators, however, succeed in flowering them in pots; such as Griffin, of South Lambeth, whose success in flowering the *Lilium japonicum* in pots has been complete. The pots he uses are of the size called twenty-fours, and the mould in which he plants the roots is composed of about two-thirds peat and one-third loam, the bottom of the pots being well drained; the bulbs are placed not more than an inch

below the surface of the mould in the pots; during winter he protects them in a green-house or garden-frame, but he prefers the former. Much might be done in the cultivation of many plants hitherto kept in the green-house, particularly such as are herbaceous, and bulbous ones in particular, in the open borders of our flower gardens, where the situation is favorable and the superintendant possessed of zeal and activity. Borders might be prepared for their reception in sheltered and warm situations, and during winter protected with a portable frame constructed for the purpose; but even common garden-frames and lights placed over such borders, and occasionally protected from severe frosts, will be found sufficient. Such borders should present a considerable slope to the south, and be completely drained at the bottom.

ALPINE PLANTS IN POTS.

By the beginning of this month, all the collection of Alpine or other rare and curious plants in pots, should be placed in their winter quarters. The most general way of protecting these plants, is by placing them under common garden-frames and lights in a dry airy situation, where they remain till the return of spring, being carefully protected from excess of moisture as well as intense frosts.

As these beautiful and diminutive plants are an ornament to the flower garden during summer, while arranged in their summer station, and as so many of them are evergreen, they may also become an ornament to it during the winter also, when placed in a proper point of view. In our practice we have had a pit constructed in the flower garden, which served a double purpose, being the abode of a collection of these plants during winter, and when these were put out in spring it was filled with the more showy species of *Mesembryanthemums* planted out in it, which flowered beautifully till killed by the first autumnal frosts, at which time it was again filled with the Alpine plants, plunged into finely-sifted coal-ashes. The walls of this pit were constructed of rock-work, which was planted with rock-plants, and was soon completely

covered. Nothing appeared during summer of a pit, when the whole was covered with plants. The wooden wall-plates and rafters were removed as soon as the Mesembryanthemums had established themselves, and were only replaced in autumn, when the others were placed into it; the lights, &c. were used during summer for other purposes. In this pit, which was elevated about a foot in front and two feet behind, we cultivated for three years one of the richest private collections of these interesting plants probably ever brought together in this country.

At first sight there will appear something incongruous in placing a pit in any part of a well-arranged flower garden, but as rock-work and similar things are admitted sometimes, though rarely, in imitation of rocky strata or mountains in miniature, but for the most part with a view to form a proper situation for plants which are natives of rocky soils to grow in, we can see no difficulty nor objection in constructing and arranging a rock-work so as to be capable of being rendered a fit receptacle for such plants during the winter. But as many, and by far the greater part of the rarer species of these plants, can only prosper in a low temperature, their removal to a shaded cool spot during the heats of our summer becomes necessary, and will of course leave a space unoccupied. Few plants, therefore, can be brought in as substitutes that will have a better effect than the genus in question. Their rapid growth, and capability of withstanding our hottest suns without requiring much water, fits them in a particular degree for such a purpose.

NOVEMBER.

PLANTING DECIDUOUS SHRUBS AND ORNAMENTAL TREES.

All kinds of deciduous shrubs and ornamental trees may be now planted, if the weather and soil be not too wet, in such cases it is better to defer this operation till February or March. In light dry soils, planting should even be gone on with in times of moderate rains, or until the ground be so wet as to adhere to the spade, which may almost be considered a safe criterion to go by.

PLANTING EVERGREENS.

Evergreen trees and shrubs may be planted in sheltered situations; great care being taken that the plants be removed with good balls, and that they be not kept out of the ground for any length of time. In times of gentle showers, evergreens may be planted, but it is not advisable to remove them in times of frosts, nor cold-cutting winds.

PREPARING SHRUBS FOR FORCING.

Where it is intended to force flowering-shrubs for the drawing-room, they should now be carefully taken up, injuring the roots as little as possible, and carefully potted into suitable sized pots, observing that it is always desirable that the pots should be as small as possible, in order that they may be the more readily disposed of when taken into the house. As the plants are only intended to perfect their flowers in the pots, their dimensions may be much less than if it were intended for them to grow in them for any length of time. The chief nourishment of plants forced for this and similar purposes should be water, therefore smaller pots may be used, than is usually the case; and during the time the plants remain in the pots, attention should be paid to give this element in abundance.

The shrubs most successfully forced are Persian and common lilacs, mezerion, syringa, honeysuckles, dwarf-almond, *Erica herbacia*, *Azalia pontica*, and other varieties; *Rhododendrons* of sorts, roses, &c.

Plants of common and Persian lilacs may be successfully taken up of any size, and planted in tubs or large boxes; the former, if it be desirable, may be removed into such boxes of any size or age. In selecting plants for this purpose, choice should be made of such as are of handsome shapes, and which have the appearance of plenty of flowering-buds. When potted, they should be placed in a dry situation; those which are in smaller pots plunged up to the tops of the pots in dry light mould, saw-dust, or coal-ashes. The larger plants, in tubs or boxes, need not be plunged, but covered round with littery matter to exclude both frost and drought. In such situations they should all remain, until they be removed into the green-house or forcing-pits.

GRASS LAWNS.

Worms will now be throwing up their lumps on the lawns, which gives them a disagreeable appearance; recourse, therefore, should be had to lime-water, with which they should be well and regularly watered, which will bring up the worms to the surface, and at the same time destroy them. The lawns should be frequently swept and rolled, that is, at least once a-week during the autumn and winter months, which will render the surface more smooth and pleasant to walk upon. Mowing should be continued as long as the grass continues to grow, and in all cases left closely mown, when that operation is discontinued for the season.

GRAVEL WALKS.

Weeds will be still making their appearance, and should be destroyed by continued hoeing and raking; or, if the walks be hard and well bound together, they should be hand-picked. For the destruction of the various species of *Conferva*, *Hypnum*, and other cryptogamic plants, nothing is so effectual as

hoeing and raking in dry days. But, when walks become very much overgrown with these plants, it is better to dig them up, and thereby present a new surface, which should be rolled down soon after the operation of turning the gravel is performed.

PLANTING BULBOUS-ROOTED PLANTS.

Such of these as were not planted last month should now be done, and those which were planted, upon the appearance of frost should be covered over with straw, or with canvas, or mats, suspended on hoops, over the beds: or, the beds may now be entirely covered, three or four inches thick, with sawdust, which may remain on them till all danger of severe frosts is over, or until the plants are beginning to be too much drawn by it, when it may be cleared off a little round each plant, so as to admit air sufficient to prevent the plant from being drawn up weak.

PLANTING HERBACEOUS PLANTS.

Most of the hardy and more common herbaceous plants may now be planted, either from the reserve-garden or from such plants as may have overgrown their prescribed limits, and are in want of being reduced in size. Plants, planted at this season, will flower much stronger than those which are not planted till spring.

POTTING HERBACEOUS PLANTS FOR FORCING.

Such herbaceous plants as are intended to be forced for the drawing-room, should now be potted. As was observed in potting shrubs for a similar purpose, pots as small as possible should be used, and dependance placed upon a sufficient supply of water for their nourishment.

ALPINE PLANTS IN POTS.

If any of the Alpine plants in pots have not been placed in their winter-quarters, that should now be done, to prevent the

pots from being broken by the expansion of frost, as well as the plants being injured by too much moisture. Those which were placed under cover last month should now be frequently looked over, and all dead or decaying leaves or stems removed, as well as all mouldiness upon the surface of the mould in the pots: any thing tending to encourage decay should be carefully removed. Many of the more rare species should have the surface of the mould in the pots covered with fine sharp sand, or small fragments of porous stone or brick-bats, to act as absorbers of superabundant moisture. The glasses or covers should now be kept on during damp and wet days, and almost always during night, in order more effectually to guard against damp or too much moisture, of which most Alpine plants, in a state of cultivation, are impatient in autumn and winter.

DRESSING THE BORDERS IN THE FLOWER GARDEN.

The flower garden borders should now be dug over, and the surface, where there are not plants the roots of which might be injured by frost, left as rough as possible, so that the frost and weather may have the more power to act upon it, in order to render it more friable and in better condition for planting the following year.

TAKING UP DAHLIAS.

By the beginning of the month the frost will most probably have cut up the dahlias, which they cannot resist for any length of time; indeed they are amongst the first plants which bear evidence of the frosts of the preceding night. Being natives of Mexico, it is necessary that we protect their roots from the attacks of frost. When the stems are destroyed, they should be cut down and removed; the roots should be left in the ground, when it is not intended that they should be taken up for the purpose of dividing or transplanting, as experience proves that roots left in the ground produce their flowers earlier the succeeding season (which with this plant is a desideratum) than if they were taken up and preserved in a house

all winter. To prevent the frosts from injuring the roots left in the ground, they should be covered all winter with coal-ashes, saw-dust, or littery dung, sufficiently thick to prevent the frost from incrustating the ground beneath. Many cultivators take the roots up, and pack them amongst dry mould; while others take them up and place them upon shelves, or otherways dispose of them till the season for planting. Others bury them in pits, like potatoes, or pack them in ridges in cellars amongst sand, or cover them with straw. It is important that they be disposed of, in whatever way they may be kept, so that they may be preserved sufficiently moist to maintain the living principle, but not so moist as to hazard their being rotted, nor yet injured by frost.

During winter, but particularly during the first few weeks after they are taken up, they should be often carefully examined, as they are more likely to become rotten when first taken into the house, than afterwards. It is of little consequence how or where they are kept during winter, so that they be dry and secured from frost. In advising that they be kept in the ground during winter, we are aware that we deviate in opinion from that of cultivators in general; however, we do not offer this opinion as being our own exclusive practice, as many cultivators adopt the same, and have come to the same conclusion, namely, that they produce their flowers much sooner and stronger. In order to prevent their becoming too bulky in the plant, a circumstance which follows this practice, we prune off all the shoots as they come up, except one, two, or three at most, according to circumstances, and continue this pruning during their whole growth, so as to model them into what size or form we choose.

DECEMBER.

PLANTING DECIDUOUS SHRUBS AND ORNAMENTAL TREES.

The planting of these may be gone on with while the weather is favourable, that is, when it is neither frosty nor too wet, in either case, the planting of them had better be deferred till February or March.

PROTECTING TENDER PLANTS.

Many tender ornamental shrubs and plants, which stand our summers, and ornament our gardens, require protection from our winters. Of these may be enumerated many plants hitherto treated as green-house plants, which the zeal of the cultivator may wish to acclimate, or to render sufficiently hardy to stand our variable climate by inuring them, by progressive degrees, to stand in the open air. The most likely situations for such experiments are those which are sheltered by nature, and where the soil is either naturally or artificially dry. Plants originated from seeds ripened in our green-houses, are to be preferred in the first instance, and great care taken to protect, by artificial means, those plants in the open air, until they have perfected seeds. Plants originated from such seeds are supposed to be more likely to stand unprotected, and so in proportion is the progeny of each succeeding generation. Those plants which annually die down to the ground are the most likely to be acclimated by this or any other means, and a slight protection of their roots may be considered sufficient. But those plants, which rank as shrubs or trees, are not so easily protected during winter, and should be planted on warm sheltered walls, or in sheltered places in the shrubbery, where, in either case, they can be partially protected by sticking a few fern-fronds or branches of trees round them, or entirely covered with mats or portable cases during severe frosts. The roots of all tender plants should be particularly

protected, either by covering the ground round them with littery dung, saw-dust, or coal-ashes. Where valuable or exotic plants may have been planted and trained against walls, which may be considered as an intermediate station between the green-house and shrubbery, they should be protected at their roots; and the more effectually to secure them, a portable glass-case might be made use of, which would sufficiently protect them till the return of spring. Such a compartment for the cultivation of many interesting shrubs and trees, too tender to stand unprotected with us, is much wanted; and indeed portable conservatories of different sizes would have their uses. All plants in pots should now be removed into cold frames or pits before the first attacks of frost, as, if left unprotected, many of them would be destroyed, although hardy enough of themselves to resist extreme cold when planted in the natural ground. While in such situations, they should have plenty of air admitted daily, and only protected during nights and on very severe days with glasses or reed-mats, which will effectually protect them from cold, as well as heavy rains and snow.

ALPINE PLANTS IN POTS.

Continue to look over the collection of these plants, in order that all appearance of decay may be removed, and that they may not suffer either from an excess of moisture or become too dry, which would, in either case, be extremely injurious to them.

AURICULAS, CARNATIONS, &c. IN POTS.

The more valuable auriculas, carnations, &c., in pots, should be often looked over, and all dead or decaying leaves removed, and care taken that they suffer not from a superabundance of moisture. Traps should be set, or other means used, to protect or rid them from the attacks of mice and other enemies, which swarm round protected frames at this season.

BULBOUS-ROOTED PLANTS.

Such of these as were not covered last month, should be now done early in this month, for severe frosts will be found

injurious to them. They will also require to be protected against the attacks of mice, which will burrow to their roots and destroy them.

DRESSING THE FLOWER BORDERS AND SHRUBBERY.

All vacant spaces should now be rough dug in the flower garden beds or borders where there are no plants, and all those borders which are planted that have not been dug should be neatly and carefully pointed over, taking care not to injure any of the plants in the process. If the hint be attended to which we have already given, of driving a wooden label or peg at the side of each plant, so that it be level with the surface, it will be a guide in pointing over the borders, as well as a mark to proceed by in planting.

The digging over of flower garden borders at this time, not only gives this department an appearance of order and neatness during winter, when there is little else to attract the eye, but it actually saves much time and trouble in the spring, when the gardener is usually busy; independently of which, it is attended with advantages, such as turning up the eggs or larvæ of insects, and even many of them, while in their torpid state, can be picked up by the birds. It ameliorates strong stiff soils, and renders them capable of being easier put into neat order in the spring. It admits the rain and snow to penetrate to the bottom of the borders, and to deposit certain salts beneficial to the growth of plants, and in fine, it gives a character of keeping to the whole that the hard beaten surface never can present.

A

SYSTEMATIC CATALOGUE

OF

HARDY DECIDUOUS TREES,

ORNAMENTAL AND USEFUL.

[*The Figures denote the height in feet which each attains under favorable circumstances.*]

ACACIA.
- Julibrissin, 20 to 30.

ACER.
- Montana, 20—30.
- Negundo, 20—30.
- Lobatum, 25—35.
- Rubrum, 20—25.
- Platanoides, 40—60.
  - *Var. Laciniata*, 30—40.
- Pseudo-platanus, 50—60.
  - *Var. Argentius*, 30—40.
  - *Var. Auria*, 30—40.
- Saccharinum, 40—50.
- Opulus, 50—60.
- Dasycarpum, 20—30.
- Pensylvanicum, 25—35.
- Hybridum, 20—30.
- Campestre, 20—30.
- Tartaricum, 25—35.

ÆSCULUS.
- Hippocastanum, 30—40.
- Pavia, 20—25.
- Rosea, 20—30.
- Flava, 20—30.
- Discolor, 15, 20.
- Ohioensis, 20—25.

AILANTHUS.
- Glandulosa, 20—30.

ALNUS.
- Glutinosa, 20—30.
  - *Var. Laciniata*, 20—30.
  - *Var. Quercifolia*, 20—30.
- Oblongata, 20—30.

AMYGDALUS.
- Communis, 20 to 30.

BETULA.
- Nigra, 50—80.
- Populifolia, 30—40.
- Excelsa, 50—60.
- Daurica, 30—40.
- Alba, 40—60.
- Lenta, 50—70.
- Lutea, 40—50.

CASTANEA.
- Vesca, 40—60.
  - *Var. Auria*, 20—30.
  - *Var. Argentia*, 20—30.
  - *Var. Hetrophylla*, 20—30.
- Americana, 40—60.

CARPINUS.
- Betulus, 30—35.
- Americanus, 35—40.
- Orientalis, 20—30.

CEPHALANTHUS.
- Occidentalis, 20—30.

COMPTONIA.
- Asplenifolia, 20—30.

CELTIS.
- Australis, 40—50.
- Occidentalis, 20—30.

CERCIS.
- Siliquastrum, 20—30.

CATALPA.
- Syringifolia, 20—30.

CUPRESSUS.
- Distica, 30—40.

CYTISSUS.
Laburnum, 30 to 40.
DIOSPYROS.
Virginiana, 20—30.
Lotus, 20—30.
FAGUS.
Sylvatica, 50—80.
Var. Purpuria, 30—40.
Ferruginea, 40—50.
FRAXINUS.
Excelsior, 50—80.
Var. Pendula.
Americana, 20—30.
Var. Pubescens, 20—30.
Hetrophylla, 30—40.
Quadrangulata, 50—60.
Fusca, 15—25.
GLEDITSCHIA.
Triacanthos, 30—40.
GYMNOCLADUS.
Canadensis, 20—30.
JUNGLANS.
Regia, 50—60.
Alba, 30—40.
Olivæformis, 30—40.
Cinerea, 30—40.
Angustifolia, 30—40.
Nigra, 30—40.
KOELREUTERIA.
Paniculata, 25—35.
LIRIODENDRON.
Tulipifera, 50—60.
Integrifolia, 50—60.
MAGNOLIA.
Acuminata, 20—30.
Cordata, 20—30.
Tripetala, 30—40.
MESPILUS.
Oxyacantha, *et var.* 20—30.
Coccinea, 20—30.
Acerifolia, 20—30.
Cordata, 20—30.
Tanacetifolia, 20—30.
Azarolus, 20—30.
Apiifolia, 20—30.
Flava, 20—30.
Crus-galli, 20—30.
Eliptica, 20—30.
Fissa, 20—30.
Laciniata, 20 to 30.
Nigra, 20—30.
Odoratissima, 20—30.
Germanica, 20—30.
MORUS.
Alba, 30—40.
Nigra, 30—40.
PINUS.
Larex, 50—100.
Pendula, 30—40.
Microcarpa, 30—40.
PLATANUS.
Occidentalis, 50—60.
Acerifolia, 50—60.
Orientalis, 20—30.
POPULUS.
Grandidentata, 20—30.
Trepida, 20—30.
Monilifera, 30—40.
Lævigata, 35—45.
Nigra, 35—45.
Hetrophylla, 20—30.
Pendula, 25—35.
Græca, 40—50.
Angulata, 45—55.
Alba, 50—60.
Tremula, 50—60.
Balsamifera, 25—35.
Dilatata, 50—60.
Canescens, 30—40.
Nivea, 30—40.
PRUNUS.
Domestica, 45—60.
Serotina, 30—40.
Avium, 50—60.
Padus, 30—40.
Pensylvanica, 30—40.
Nigra, 20—30.
Cerasus, 40—50.
Insititia, 15—20.
PYRUS.
Angustifolia, 20—30.
Communis, 20—35.
Coronaria, 20—30.
Salicifolia, 20—30.
Spectabilis, 20—30.
Prunifolia, 20—30.
Malus, 20—25.
Aria, 35—40.

Torminalis, 40 to 50.
Aucuparia, 30—40.
Hybrida, 30—40.
Cydonia, 15—25.

QUERCUS.
Alba, 40—50.
Aquatica, 40—50.
Candida, 40—50.
Hètrophylla, 40—50.
Lucombeana, 50—60.
Coccinea, 50—60.
Turneri, 50—60.
Montana, 50—60.
Falcata, 40—50.
Robur, 40—50.
Pedunculata, 50—100.
Rubra, 40—50.
Tinctoria, 40—50.
Palustrus, 50—70.
Prinus, 50—60.

ROBINIA.
Pseudo-acacia, 40—50.
Viscosa, 30—40.

SALEX.
Capera, 30 to 40.
Triandria, 30—40.
Amygdalina, 30—40.

SALISBURIA.
Adiantifolia, 20—30.

TILIA.
Alba, 30—40.
Americana, 30—40.
Platyphylla, 50—70.
Microphylla, 30—40.

ULMUS.
Americana, 40—50.
Pendula, 40—50.
Alba, 40—50.
Montana, 40—50.
Suberosa, 40—50.
Nemoralis, 40—50.
Campestris, 50—80.

All of these will succeed well in any moderately good garden-ground. It is, however, of importance to their future welfare, that the ground be properly prepared for them, by being effectually drained, if at all wet, and trenched to the depth of two feet, or if to the depth of three, so much the better.

HARDY EVERGREEN TREES AND SHRUBS.

ACER.
Creticum, 2 to 4.

ANDROMEDA.
Pulverulenta, 2—4.
Polifolia, *et var.* 1—2.
Catesbæi, 1—2.
Axillaris, 1—2.
Coriacea, 1—2
Acuminata, 2—4.
Calyculata, *et var.* 1—2.

ARISTOTELIA.
Macqui.

ARBUTUS.
Unedo, *et var.* 4 to 10.
Laurifolia, 4—10.
Andrachne, 4—7.
Hybrida.
Alpina.
Uva-ursi.

AUCUBA.
Japonica, 4—7.

ATRIPLEX.
Halimus, 4—7.
Portulacoides, 1—3.

BERBERIS.
Aquifolium.
BUDDLEA.
Globosa, 4 to 7.
BUPLEURUM.
Fruticosum, 4—7.
BUXUS.
Sempervirens.
Balearica, 4—10.
CERASUS.
Lauro cerasus, 15—20.
Caroliniana.
Lusitanica, 20—30.
CISTUS.
Ladaniferus, 2—4.
Laxus, 2—3.
Latifolius, 2—3.
Albidus, 1—2.
Creticus.
Candidissimus.
Corbiensis.
Hetrophyllus.
Crispus, 1—2.
Incanus.
Hirsutus.
Monspeliensis, 1—2.
Vaginatus, 1—2.
Parviflorus.
Villosus, 2—3.
Salvifolius, 2—3.
Purpureus.
Populifolius, 2—4.
Longifolius.
Ledon.
Cyprius.
Laurifolius, 2—4.
Monspeliensis, 1—2.
CNEORUM.
Tricoccum, 1—2.
CRATÆGUS.
Pyracantha.
CUPRESSUS.
Sempervirens, 20—30.
Thyoides, 25—30.
Lusitanica, 25—30.
DAPHNE.
Tarton-raira, 1—2.
Collina, 2—4.
Lauriola, 2 to 4.
Pontica, 2—4.
Oleoides, 1—2.
Cneorum, *et var.* 0.
Hybrida, 1—3.
ERICA.
Australis, 1—3.
Mediterranea, 1—4.
Minima, 1—2.
Arborea, 3—10.
Carnea, 1.
ERIOBOTRYA.
Japonica, 2—7.
EUONYMUS.
Americanus, 2—4.
GAULTHERA.
Procumbens, 0—1.
Shallon, 0.
GENISTA.
Candicans.
HELIANTHEMUM.
Umbellatum.
Ocymoides.
Canadense.
Alpestre.
Vineale.
Canum.
Tomentosum.
Leptophyllum.
Vulgare.
Serpyllifolium.
Surrejanum.
Grandiflorum.
Obscurum.
Roseum.
Versicolor.
Hyssopifolium.
Sulphureum.
Vulgatum.
Venustum.
Canescens.
Pilosum.
Nummularium.
Hispidum.
Apenninum.
IBERIS.
Sempervirens.
Frutescens.

ILEX.
- Aquifolium, *et var.* 10 to 30.
- Cassine, 2—4.
- Opaca, 2—4.
- Perado, 2—4.

JUNIPERUS.
- Daurica.
- Sabina, 2—4.
- Glauca.
- Prostrata, 0—2.
- Communis, 10—20.
- Hibernica.
- Suecica, 10—20.
- Virginiana, 30.
- Phœnicea, 10—20.
- Lycia, 10—20.

KALMIA.
- Latifolia, 2—7.
- Nitida, 2—3.
- Angustifolia, 2—3.
- Glauca, 2—3.

LAURUS.
- Nobilis, 10—20.

LAVENDULA.
- Spica, 1—2.
- Latifolia, 1—2.

LEDUM.
- Palustre, 1.
- Latifolia, 1—2.
- Buxifolia, 0—1.

LIGUSTRUM.
- Lucidum, 2—7.

MAGNOLIA.
- Grandiflora, *et var.* 10—20.
- Longifolia, 10—20.

OXYCOCCOS.
- Palustris, 0.
- Macrocarpus, 0.
- Erythrocarpum.

PHILLYREA, *(now Olia.)*
- Latifolia, 2—10.
- Ilicifolia, 2—10.
- Obliqua, 2—10.
- Angustifolia, 2—7.
- Oleæfolia, 2—7.
- Lævis, 2—7.
- Media, 2—7.
- Pendula, 2—7.

PHLOMIS.
- Purpuria, 1—3.
- Lanata, 1—3.
- Fruticosa, 1—3.

PHOTINIA.
- Arbutifolia.
- Serrulata.

PINUS.
- Nigra, 45.
- Rubra, 30.
- Alba, 80.
- Pinea, 40.
- Cembra, 50.
- Sylvestris, 30—100.
- Laricio, 80.
- Pinaster, 60.
- Strobus, 100—150.
- Abies.
- Cedrus, 70—80.
- Picea.
- Canadensis, 40.
- Pichta.
- Balsamea, 50.
- Pumilio, 6.
- Inops, 40.
- Resinosa, 50.
- Palustris, 50.
- Halapensis, 25.
- Fraseri, 30.
- Taurica.
- Mitis.
- Serotina, 60.
- Clanbrassiliana, 2—3.
- Lanceolata, 25.
- Pumila, 25.
- Tæda, 30.
- Variabillis, 35.
- Pungens, 40.
- Rigida, 50—70.

POLYGALA.
- Chamæ-buxus, 0.

PRINOS.
- Glaber, 2 to 3.

QUERCUS.
- Virens, 35.
- Ilex, *et var.* 35.
- Subur, 25.
- Coccifera, 30.

Cerris, *et var.* 60.
Laurifolia, 40.
Gramuntia, 25.
Ballota.
Esculus, 35.
Phellos, 35.

RHODODENDRON.
Ferrugineum, 1—2.
Hirsutum, 1—2.
Catawbiense.
Ponticum, *et var.* 4—7.
Maximum, do. 4—7.
Camtschaticum.
Punctatum, 2—4.
Arboreum, 2—7.
Hybridum, 2—4.
Azaleoides, 1—3.

ROSMARINUS.
Officinalis, 1—4.

RUSCUS.
Aculeatus, 1—1½.
Laxus, 1—2.
Hypophyllum, 0—1.
Hypoglossum, 0—2.
Rasimosus.

SALSOLA.
Fruticosa, 1—2.

SALVIA.
Officinalis, 1 to 2.

SANTOLINA.
Chamæ-cyparissus.

TAXUS.
Baccata, 25—30.
Hibernica, 2—10.
Procumbens.

THUJA.
Occidentalis, 10—20.
Orientalis, 10—20.
Tartarica, 4—10.
Pyramidalis.

VACCINIUM.
Vitis-idæa, 0.
Buxifolium, 0.
Nitidum.
Crassifolium, 1—1½.
Myrsinites, 1—2.

VIBIRNUM.
Tinus, 4—7.
Lucida, 4—7.
Strictum, 4—7.
Rugosum.
Cassinifolius, 2—6.

YUCCA.
Filimentosa, 1—2.
Stricta, 1—2.
Glaucescens, 1—2.
Angustifolia, 1—2.
Rufocincta, 1—2.
Obliqua, 1—2.
Superba, 2—6.
Concava, 1—2.
Gloriosa, 2—4.

HARDY SHRUBS,

WHICH THRIVE UNDER THE DRIP AND SHADE OF TREES.

DECIDUOUS.

CORNUS.
Alba.
Alternifolia.
Florida.
Sanguinia.

CORYLUS.
Avellana.

DAPHNE.
Mezereum.

DECIDUOUS—CONTINUED.

EUONYMUS.
- Europeus.
- Latifolius.
- Angustifolius.

HYPERICUM.
- Hircinum.

LIGUSTRUM.
- Vulgare.

LONICERA.
- Symphoricarpus.
- Tartarica.
- Xylosteum.

MESPILUS.
- Tomentosa.

ROSA.
- Arvinsis.
- Rubiginosa.
- Canina.
- Sempervirens.

RUBUS.
- Occidentalis.
- Odoratus.
- Villosus.

SAMBUCUS.
- Nigra.
- Laciniata.
- Racimosa.

SPIRÆA.
- Salicifolia.

EVERGREEN.

AUCUBA.
- Japonica.

BUXUS.
- Sempervirens, *et var.*

DAPHNE.
- Laureola.

EPHEDRA.
- Distachya.
- Monostachya.

HYPERICUM.
- Androsæmum.
- Calycinum.

ILEX.
- Aquefolia, *et var.*

LIGUSTRUM.
- Vulgare *var.* sempervirens.

PRUNUS.
- Lauro-cerasus.
- Lusitanica.

VIBURNUM.
- Tinus, *et var.*

CLIMBERS,

Which will grow under the drip of Trees.

CLEMATIS.
- Vitalba.

HEDERA.
- Helix, *et var.*

LONICIRA.
- Periclymenum.

ROSA.
- Arvinsis.
  - *Var. Scandens.*

VINCA.
- Major.
- Minor.
  - *Var. fol. varigata, &c.*

This is an extremely useful section of plants, both for the purpose of forming an agreeable underwood, and for hiding unpleasant objects in situations where few other plants would live.

HARDY SHRUBS,

OF RAPID GROWTH, CALCULATED TO PRODUCE IMMEDIATE EFFECT, &c.

DECIDUOUS.

COLUTEA.
- Arborescens.
- Frutescens.

CORNUS.
- Alba.
- Florida.
- Sanguinea.

CYTISUS.
- Laburnum.
- Sessilifolium.

LIGUSTRUM.
- Vulgare.

PHILADELPHUS.
- Coronarius.

ROSA.
- Villosa.
- Arvinsis.

SAMBUCUS.
- Nigra.

SPIRÆA.
- Opulifolia.
- Salicifolia.

SYRINGA.
- Vulgaris.

VIBIRNUM.
- Opulus.

EVERGREENS.

CUPRESSUS.
- Sempervirens.

ILEX.
- Aquifolium.

JUNIPERUS.
- Virginiana.

LIGUSTRUM.
- Vulgaris *var.* Sempervirens.

MESPILUS.
- Pyracantha.

QUERCUS.
- Gramuntia.

PRUNUS.
- Lauro-cerasus.
- Lusitanica.

RHAMNUS.
- Alaternus.

SPARTIUM.
- Junceum.

TAXUS.
- Baccata.

THUJA.
- Occidentalis.
- Orientalis.

ULEX.
- Europeus.

These may be planted of a large size, and so disposed that they may be either taken up or cut down, as those of greater value advance.

HARDY SHRUBS,

For planting by the sides of Rivers or Ponds, or in marshy ground, where few others would thrive.

DECIDUOUS.

ALNUS.
- Pumila.

BETULA.
- Nana.
- Pumila.
- Siberica.

DIRCA.
- Palustrus.

MYRICA.
- Cerifera.
- Gale.

SALEX.
- Most of the species.

EVERGREEN.

LEDUM.
- Palustre.

ARBUTUS.
- Unedo.

RHODODENDRON.
- Maximum.
- Ponticum.

EMPETRUM.
- Nigrum.

OXYCOCCUS.
- Palustrus.
- Macrocarpus.

HARDY DECIDUOUS FLOWERING SHRUBS.

AMELANCHIER.
- Vulgaris, 4 to 7.
- Botryapium, 4—7.

AMYGDALUS.
- Nana, 2—4.
- Pumila, 2—4.
- Prosterata, 0—2.

ANDROMEDA.
- Globulifera, 2—4.
- Paniculata, 2—4.
- Undulata, 2—4.
- Mariana, 0—2.
- Cassinifolia, 2—4.
- Dealbata, 2—4.
- Frondosa, 2—4.
- Pulverulenta, 2—4.
- Racimosa, 2—4.
- Arborea, 7—10.

ARALIA.
- Spinosa, 4 to 7.

ARONIA.
- Arbutifolia.
- Floribunda.
- Melanocarpa.

ARTAMESIA.
- Absinthium, 1—2.

ASIMINA.
- Triloba.

ASTRAGALUS.
- Tragacanthus, 0—1.

AZALIA.
- Pontica, 4—7.
  - *Var. Albiflora*, 4—7.
  - *Tricolor*, 4—7.
  - *Pallida*, 2—4.

Calendulacea, 2 to 4.
Var. Grandiflora.
Splendens.
Triumphans.
Flammea.
Chrysolecta.
Canescens, 2—4.
Speciosa, 2—4.
Var. Major.
Undulata.
Aurantia.
Crispa.
Ciliata.
Muliflora, 2—4.
Var. Alba.
Albo-plena.
Blanda.
Coccinia.
Florida.
Pumila.
Tricolor.
Mirabilis.
Carnea.
Purpureo-plena.
Rosea.
Bicolor, 2—4.
Viscosa, 2—4.
Var. Odorata.
Vittata.
Arborescens, 4—7.
Nitida, 2—4.
Glauca, 2—4.
Hispida 2—4.

BERBERIS.
Vulgaris, 4—7.
Chinensis.
Siberica, 2—4.
Canadensis, 4—7.

BETULA.
Nana, 2—4.
Pumila, 2—4.

CARAGANA.
Arborescens, 7—10.
Altagana, 2—4.
Pygmæa, 0—1.
Frutescens.
Spinosa, 4—7.
Chamlagu, 2—4.
Redowskii, 1—2.
Mollis, 2 to 4.
Halodendron, 4—7.
Jubata, 2—4.
Aranaria, 2—4.
Microphylla.
Grandiflora.

CALYCANTHUS.
Florida, 2—4.
Oblongifolius.

CERASUS.
Nigra, 7—10.
Padus, 10—20.
Serotina, 7—10.

CHIMONANTHUS.
Fragrans.
Var. Grandiflora.

COLUTEA:
Pocockii, 4—7.
Nepalenses.
Arborescens, 4—10.
Cruenta, 2—4.
Media.

CORIARIA.
Myrtifolia, 2—4.

CORNUS.
Florida, 2—4.
Mascula, 7—10,
Alternifolia, 7—10.
Stricta, 7—10.
Alba, 7—10.
Sanguinea, 4—10.
Sericia.
Circinata.
Paniculata.

CORONILLA.
Emerus, 4—7.

COTONASTER.
Affinis.
Vulgaris, 2—4.
Acuminata.
Tomentosa, 4—7.
Eriocarpa.

CYTISUS.
Biflorus, 2—4.
Purpureus, 2—4.
Albus.
Alpinus, 2—4.
Nigricans, 2—4.
Patens, 2—4.

Sessilifolius, 4 to 7.
Scoparius, 2—4.
Argentius, 2—4.
Supinus, 0—2.
Hirsutus, 2—4.
Elongatus, 2—4.
Calycinus, 2—4.
Capitatus, 2—4.

DAPHNE.
Mezereum, 2—4.
Var. flo. alba, 2—4.
Altaica.

DIERVILLA.
Pumilis, 2—4.

DIOTIS.
Ceratoides.

ELEAGNUS.
Europeus, 4—7.
Latifolius, 4—7.
Verrucosus, 4—7.
Atropurpureus, 4—7.

FOTHERGILLÆ.
Alnifolia, 2—4.

GENISTA.
Triquetra, 2—4.
Radiata, 2—4.
Pilosa, 0—2.
Procumbens, 1—2.
Lusitanica, 2—4.
Hispanica, 2—4.
Germanica, 2—4.
Anglica, 1—2.
Sericea, 2—4.
Siberica, 2—4.
Tinctoria, 2—4.
Florida, 2—4.
Prosterata, 1—2.
Diffusa, 1—2.
Ovata, 1—2.
Sagittalis, 0—1.

GLEDITSCHIA.
Horrida, 5—10.
Sinensis, 5—10.

HALESIA.
Tetraptera, 4—7.
Diptera, 4—7.

HALIMODENDRON.
Argenteum.

HAMAMELIS.
Virginica, 10 to 20.

HELIANTHEMUM.
Canadense.
Alpestre.
Vineale.
Canum.
Tomentosum.
Grandiflorum.
Obscurum.
Vulgare.
Leptophyllum.
Pilosum.
Serpyllifolium.
Sarrejanum.
Lineare.
Nummularium.
Mutabile.
Roseum.
Polifolium.
Sulphurium.
Hyssopifolium.
Apenninum.
Pulverulentum.
Variegatum.
Canescens.
Venustum.
Rhodanthum.

HIBISCUS.
Syriacus, 2—4.
Var. Albo-plena.
Purpureo-pleno.
Rubra.
Alba.
Purpureus.

HIPPOPHÆ.
Rhamnoides, 10—20.
Canadensis, 7—10.

HYDRANGEA.
Radiata, 4—7.
Arborescens, 4—7.

HYPERICUM.
Androsæmum, 4—7.
Calycinum, 2—4.
Prolificum, 2—4.
Hircinum, 2—4.

LAURUS.
Benzoin, 4—10.
Sassafras, 4—10.

LIGUSTRUM.
Vulgare, 7 to 10.
LIQUIDAMBER.
Styraciflua, 10—20.
Imberbe, 10—20.
LONICERA.
Alpigena, 4—7.
Cœrulia, 2—4.
Nigra, 2—4.
Tartarica, 2—6.
Pyrenaica, 4—7.
Xylosteum.
MACLURA.
Aurantiaca.
MAGNOLIA.
Macrophylla, 4—10.
Auriculata, 4—10.
Pyramidata, 4—10.
MENZESIA.
Ferruginea, 2—4.
Globularis, 2—4.
NYSSA.
Villosa.
Denticulata.
ONONIS.
Fruticosus, 1—2.
PŒONIA.
Moutan, 2—8.
Var. Papaveracea, 2—4.
Banksii.
Rosea.
PALIURUS.
Virgatus, 4—10.
Aculeatus, 4—10.
PHILADELPHUS.
Grandiflorus, 4—7.
Gracilis, 4—7.
Coronarius, 4—7.
Inodorus, 0—2.
POTENTILLA.
Floribunda, 1—3.
Fruticosa, 1—3.
PTELEA.
Trifoliata, 2—4.
PUNICA.
Granatum, 2—4.
Var. flo. pleno.
RHAMNUS.
Saxatilis, 0—2.
Frangula, 4 to 10.
Latifolius, 4—7.
RHODODENDRON.
Dauricum, 2—4.
RHODORA.
Canadensis, 2—4.
RHUS.
Vernix, 4—7.
Elegans, 4—7.
Typhinum, 4—7.
Glabrum, 4—7.
Cotinus, 10—20.
Radicans, 2—4.
Copallinum, 4—7.
Toxicodendron, 4—10.
Aromaticum, 2—4.
RIBES.
Floridum, 2—4.
Aureum, 2—4.
Alpinum, 2—4.
ROBINIA.
Hispida, 2—4.
RUBUS.
Canadensis.
Odoratus.
SOPHORA.
Japonica, 4—7.
SPARTIUM.
Junceum, 2—4.
Var. flo. pleno.
Multiflorum, 4—7.
SPIRÆA.
Lævigata, 2—4.
Triloba, 2—4.
Bella, 2—4.
Tomentosa, 3—6.
Salicifolia, 3—6.
Hypericifolia, 3—6.
Crenata, 2—4.
Opulifolia, 4—6.
Chamædrifolium, 2—4.
Sorbifolia, 2—4.
STAPHYLEA.
Trifolia, 4—7.
Pinnata, 4—7.
SYMPHORIA.
Glomerata, 2—4.
Racimosa, 2—4.

SYRINGA.
Vulgaris, 4 to 7.
Var. Violacea, 4—7.
Alba, 3—6.
Chinensis.
Persica, 2—4.
Var. Alba.
Laciniata.

TAMARIX.
Gallica, 2—4.
Germanica, 2—4.

TAXODIUM.
Distichum, 2—4.

ULEX.
Europæus, 1—2.
Var. flo. pleno.

VIBIRNUM.
Lautana, 7 to 10.
Opulus, 7—10.
Lavigatum, 7—10.
Pubescens.
Molle.
Nudum, 2—4.
Prunifolium, 4—7.
Dentatum, 2—4.
Nitidum, 2—4.

VITEX.
Agnus-castus, 10—15.

ZANTHORHIZA.
Apiifolia, 0—1.

ZANTHOXYLUM.
Tricarpum, 4—7.
Fraxineum, 4—7.

Of these, the families of *Andromeda, Azalia, Rhodora, Rhododendron, Daphne, Menzesia, Magnolia*, and *Vaccinium*, require to be planted in bog or heath-mould; the remainder will succeed perfectly well, if planted in any moderately good garden ground.

HARDY CLIMBERS.

AMPELOPSIS.
Hederacea. (*white*)

ARISTOLOCHIA.
Sipho. (*yellow*)
Tomentosa.

ATRAGENE.
Americana.
Siberica. (*white*)
Austriaca. (*blue*)
Ochotensis.

BIGNONIA.
Capereolata.
Radicans. (*yellow*)

CELASTRUS.
Scandens. (*white*)

CLEMATIS.
Flamula.
Orientalis. (*yellow*)
Glauca.
Chinensis.
Vitalba. (*white*)
Virginiana. (*red*)
Tridentata. (*yellow*)
Dahurica.
Diversifolia.
Viorna. (*red*)
Cylendrica.
Simsii.
Reticulata. (*yellow*)
Florida. (*white*)

Var. flora-pleno. (*white*)
Viticella. (*purple*)
Var. Purpuria.
Pulchella.
Calycina.
Crispa.
Cirrhosa.
Pedicellata.

DECUMARIA.
Barbata.
Sarmentosa.

HEDERA.
Canadensis.
Helix.

JASMINUM.
Humile. (*yellow*)
Frutescens.
Officinalis. (*white*)
Revolutum.

LONICERA.
Chinensis.
Dioica.
Flava. (*yellow*)
Caperifolium. (*yellow*)
Sempervirens. (*red*)
Pubescens.
Implexa. (*red*)
Grata. (*green*)
Periclymenum. (*white*)
Belgicum. (*white*)

LYCIUM.
Chinense.
Barbatum. (*red*)
Ruthenicum.

MENISPERMUM.
Virginicum. (*green*)
Canadense. (*green*)

PASSIFLORA.
Cœrulia. (*blue*)
Colvillii. (*blue*)

PERIPLOCA.
Græca. (*white*)

ROSA.
Multiflora. (*red*)
Var. Alba. (*white*)
Sempervirens. (*white*)
Boursoulti. (*red*)
Banksiæ.
Hyacinthina.

RUBUS.
Laciniatus.
Fruticosus. (*white*)
Var. flo. pleno.
fol. varigata.

SMILAX.
Aspera. (*green*)
Caduca.
Quadrangularis.
Bona-nox.
Laurifolia.
Sarasaparilla. (*green*)
Lanciolata.

VITIS.
Rotundifolia. (*green*)
Vulpina. (*green*)
Labrusca. (*green*)
Riparia. (*green*)
Laciniosa. (*green*)

WENDLANDIA.
Populifolia.

WISTERIA.
Chinensis.
Frutescens. (*yellow*)

The object in view being generally to obtain a large size, so as to cover objects either vertical or horizontal; the soil, therefore, for climbing plants should be more carefully prepared than for those which compose the general mass of shrubs. A soil, prepared as follows, will be found to answer every expectation, supposing that all other circumstances prove favorable: — Fresh maiden loam of rather a light texture, bog or heath mould, each an equal portion; to which may be added, one-eighth of perfectly rotten dung.

FLOWER GARDEN HERBACEOUS PLANTS,

That will stand our Climate without Protection.

ACANTHUS.
- Mollis.
- Spinosus.
- Spinosissimus.
- Ilicifolius.

ACONITUM.
- Lycoctonum.
- Album.
- Variegatum.
- Japonicum.
- Uncinatum.
- Speciosum.
- Volubile.
- Exaltatum.
- Virgatum.
- Amænum.
- Formosum.
- Venustum.
- Pyramidale.
- Versicolor.
- Decorum.
- Lætum.
- Rubellum.

ACHILLEA.
- Grandiflora.
- Ptarmica.
  - *Flore-pleno.*
- Ageratum.
- Speciosa.
- Alpina.
- Serrata.
- *Clavennæ.
- Impatiens.
- Auria.
- Compacta.
- Aspienifolia.
- Nobilis.
- Rosea.
- Holosericea.

ADONIS.
- Vernalis.
- Apennina.

AGROSTEMMA.
- Coronaria.
  - a *Rubra.*
  - b *Alba.*
  - c *Pleno.*

ALCHIMILLA.
- *Pubescens.
- *Alpina.
- *Sericea.
- *Hybrida.

ALETRIS.
- Auria.
- Farinosa.

ALYSSUM.
- *Saxatile.
- *Orientale.
- *Argentium.
- *Obtussifolia.
- *Tortuosum.
- *Vernale.
- *Montana.

AMARYLLIS.
- Belladonna.

AMMOBIUM.
- Alatum.

AMSONIA.
- Latifolia.
- Salicifolia.
- Angustifolia.

ANCHUSA.
- Paniculata.
  - *Italica.*
- Procera.

ANDROSACEA.
- *Villosa.
- *Chamæjasme.

*Lactea.
*Obtussifolia.

ANEMONE.
Coronaria.
a *Flore-pleno.*
Stellata.
Palmata.
Apennina.
Nemerosa.
a *Flore-pleno.*
Sylvestris.
Alba.
Dichotoma.
Virginiana.
Pensylvanica.
Vid. Pulsatilla et Hepatica.

ANTIRRHINUM.
Majus.
a *Coccinia.*
b *Bicolor.*
c *Multiplex.*
Angustifolium.

ANTHYLLIS.
*Montana.
*Alpina.
*Onobrychioides.
*Dillenii.

APOCYNUM.
Androsæmifolium.
Hypericifolium.
Venetum.

APIOS.
Tuberosa.

AQUILEGIA.
Vulgaris.
Canadensis.
Atropurpurea.
Viridiflora.
Viscosa.
Siberica.
Alpina.
Formosa.
Hybrida.
Glandulosa.
Pyrenaica.

ARABIS.
*Præcox.
*Ambigua.
*Alpina.
*Albida.
*Longifolia.
*Crispata.
*Muralis.
*Stricta.
*Procurrens.
*Petræa.
*a *Hispida.*
*b *Hastulata.*
*Lyrata.
*Stolonifera.
*Ovirensis.
*Lucida.
*Pumila.
*Bellidifolia.
*Cœrulia.
*Collina.

ARALIA.
Nudicaulis.
Racimosa.

ARETIA.
*Vitaliana.
*Alpina.

ARENARIA.
*Graminifolia.
*Longifolia.
*Formosa.
*Grandiflora.
*Ramosissima.
*Saxatilis.
*Balearica.
*Montana.
*Multicaulis.
*Dahurica.
*Otitoides.
*Verna.

ARTEMISIA.
*Glacialis.
*Rupestris.
*Pedemontana.
*Caucasica.
*Spicata.
*Saxatilis.
*Glauca.
*Nivia.
*Sericea.

ASCLEPIAS.
Tuberosa.
Syriaca.

Nivea.
Incarnata.
Rubra.
Laurifolia.
Amplexicaulis.
Obtusifolia.
Amæna.
Pulchra.

ASPHODELUS.
Fistulosus.
Ramosus.
Creticus.
Æstivus.
Altaicus.

ASTER.
*Alpinus.
Pulchellus.
Præcox.
Blandus.
Pulcherrimus.
Tradescanti.
Acuminatus.
Eminens.
Divergens.
Pallens.
Alwartensis.
Undulatus.
Altaicus.
Spectabilis.
Floribundus.
Novi-belgii.
Mutabilis.
Elegans.
Versicolor.
Bellidiflorus.
Cyaneus.
Grandiflorus.
Carolinianus.
Novæ-angliæ.
Amellus.
Concolor.
Multiflorus.
Ericoides.
Nemoralis.
Canus.

ASTRAGALUS.
*Hypoglottis.
Leucophæus.
Carnosus.
*Alopecuroides.
Alopecias.
Tomentosus.
*Tragacantha.
Longiflorus.
Excapus.
*Gracilis.
*Diffusus.
Odoratus.
*Montana.
*Uralensis.

ASTRANTIA.
Major.
Carniolica.
Caucasica.
Maxima.
*Minor.

BELLIS.
*Sylvestris.
*Perennis.
*Hybrida.

BELLIUM.
*Minutum.

BOCCONIA.
Cordata.

BORAGO.
*Laxiflora.
Crassifolia.
Orientalis.

CALCEOLARIA.
*Fothergillii.

CAMPANULA.
*Pulla.
*Carpathica.
*Rotundifolia.
*Pumila.
Neglecta.
Linifolia.
Caucasica.
Persicifolia.
a *Cærulia.*
b *Alba.*
c *Alba-pleno.*
a *Cærulia-pleno.*
Pyramidalis.
Versicolor.
*Nitida.
a *Cærulia.*
b *Alba.*

Latifolia.
a *Alba*.
Macrantha.
Urticifolia.
Infundibuliformis.
Bononiensis.
Aggregata.
Speciosa.
Multiflora.
Collina.
*Azurea.
Lactiflora.
Thyrsoidea.
Barbata.
*Punctata.
Betonicifolia.
*Alpina.
Alliariæfolia.
Lamiifolia.
Siberica.
Lingulata.

CARDAMINE.
*Pratensis.
**Flora-pleno*.
*Amara.
*Rotundifolia.

CATANANCHE.
Cœrulia.

CENTAURIA.
Glastifolia.
Alba.
Macrocephala.
Alata.
Phrygia.
Centaurium.
Rivularis.

CERASTIUM.
*Grandiflorum.
*Tomentosum.
*Biebersteinii.
*Lanatum.
*Latifolium.
*Alpinum.
*Repens.
*Suffruticosum.
*Pubescens.
*Pilosum.

CHEIRANTHUS.
*Cheiri, *many varieties*.
*Alpinus.

CHELONE.
Grandiflora.
Digitalis.
Glabra.
Oblequa.
Lyoni.
Rosea.
Barbata.
Campanulata.
Lævigata.
Pubescens.
Cristata.

CHRYSANTHEMUM.
Atratum.
Montanum.
Arcticum.
Paludosum.
Rotundifolium.
Sinense.

Indicum.—Of this very interesting species, the following are varieties, and have been chiefly introduced by the Hort. Soc.: * —

Old purple.
Changeable white.
Quilled white.
Superb white.
Tasselled white.
Quilled yellow.
Straw-colored.
Golden yellow.
Large lilac.
Pink or lilac.
Buff or copper-colored.
Spanish brown.
Quilled flame yellow.
Quilled pink.
Early crimson.
Large quilled orange.
Expanded light purple.
Quilled light purple.
Curled lilac.

* We have preferred giving the English names of the varieties of this species, as being more generally used.

Superb clustered yellow.
Semi-double quilled pink.
Semi-double quilled white.
Semi-double quilled orange.
Late pale purple.
Quilled salmon-colored.
Small yellow.
Paper-white.
Pale pink.
Tasselled yellow.
Yellow Waratah.
Golden Lotus.
Double Indian yellow.
Park's small yellow.
Pale buff.
Blush.
Double Indian white.
Starry purple.
Early blush.
Brown purple.

COLCHICUM.
Autumnale.
Montanum.
Arenarium.

CONVALLARIA.
Majalis.
a *Alba.*
b *Rosea.*
c *Plena.*

CONVOLVULUS.
Holocericeus.
Salvifolius.
*Lineatus.
Sibthorpii.
Hirsutus.
Tiliaceus.

COREOPSIS.
Grandiflora.
Verticillata.
Tenuifolia.
Auria.
Discolor.
Senifolia.
Amplexicaulis.
Palmata.
Auriculata.
Latifolia.
Arguta.
Lanciolata.
Crassifolia.
Angustifolia.

CORONILLA.
*Iberica.
*Coronata.
*Cappadocica.
*Varia.

CORTUSA.
*Mathioli.

CORYDALIS.
*Lutea.
Uralensis.
Glauca.
Nobilis.
Bracteata.
Angustifolia.
Bulbosa.
Tuberosa.

CROCUS.
Albiflorus.
Biflorus.
Vernus.
Versicolor.
Striatus.
Pusillus.
Nudiflorus.
Susianus.
Sativus.
Stellaris.
Reticulatus.
Sulphureus.
Mæsiacus.
Lagenæflorus.
Serotinus.

CYCLAMEN.
*Cocem.
*Vernum.
*Europeum.
*Hederæfolium.
*Neapolitanum.

CYNANCHUM.
Vincetoxicum.
Fuscatum.
Sibericum.
Roseum.
Acutum.

CYPRIPEDIUM.
Arietinum.
Spectabile.

Calceolis.
Pubescens.
Humile.
Parviflorum.

DAHLIA.
Many varieties.

DALIBARDA.
*Repens.

DELPHINIUM.
Pictum.
Speciosum.
Laxiflorum.
Intermedium.
Grandiflorum.
a *Album.*
b *Flore-pleno.*
c *Chinense.*
Puniceum.
Hybridum.
Fissum.
Elegans.
Tricorne.
Amænum.
Azureum.
Exaltatum.
Revolutum.

DIANTHUS.
Barbatus.
a *Flore-pleno.*
*Latifolius.
*Capitatus.
*Atrorubens.
*Carthusianorum.
*Polymorphus.
*Collinus.
*Campestris.
*Alpestris.
*Nitidus.
*Guttatus.
Versicolor.
*Montanus.
Caryophyllus.
a *Flore-pleno.*
b *Fruticosus.*
c *Imbricatus.*
Superbus.
*Fragrans.
Serotinus.
*Arenarius.
Fimbriatus.
Hortensis.
Squarrosus.
*Petræus.
*Glacialis.
*Alpinus.
*Cæsius.
*Deltoides.
Pungens.

DICTAMNUS.
Albus.
Fraxinella.

DIGITALIS.
Lutea.
Media.
Orientalis.
Auria.
Ferruginea.
Ambigua.
Fulva.
Obscura.

DODECATHEON.
Media.

DORONICUM.
Caucasicum.
Orientale.

DORYCNIUM.
Herbacium.

DRABA.
*Aizoides.
*Stellata.
*Hirta.
*Alpina.

DRYAS.
*Octopetale.

DRACOCEPHALUM.
Nutans.
Speciosum.
Denticulatum.
Sibericum.
Virginianum.
Palmatum.
Botryoides.
Austriacum.
Ruyschiana.

EPILOBIUM.
Spicatum.
Halleri.
Latifolium.

Coloratum.
Angustissimum.

ERIGENON.
Grandiflorum.
*Alpinum.
*Uniflorum.
*Villarsii.
Caucasicum.
Compositum.
Carolianum.
Nudicaule.
Purpurium.
Philadelphicum.
Bellidifolium.

ERINUS.
*Alpinus.
*Hispanicus.

EREPETION.
*Reniforme.

ERODIUM.
*Richardi.
*Gussonii.
*Hymenodes.
*Serotinum.
*Alpinum.
Glaucophyllum.
Malopoides.

ERYNGIUM.
Azureum.
Bourgati.
Maritimum.
Alpinum.
Amethystinum.
Planum.
Aquaticum.
Cœruleum.

FARSETIA.
*Lunarioides.

FRITILLARIA.
Imperialis.
Obliqua.
Meleagris.
Præcox.
Latifolia.
Lutea.
Nervosa.
Tenella.
Nigra.
Pyrenaica.
Persica.
Pudica.
Lanciolata.

FRAGARIA.
*Indica.

GALARDIA.
Bicolor.
Aristata.

GALANTHUS.
Nivalis.

GALAX.
*Cordifolia.

GALIGA.
Officinalis.
a *Cœrulia.*
b *Alba.*
Biloba.
Persica.
Orientalis.

GENTIANA.
Lutea.
*Ciliata.
*Verna.
Baverica.
*Pumila.
Pyrenaica.
*Aculus.
Purpuria.
Punctata.
*Septemfida.
Cruciata.
Asclepedia.
Saponaria.
*Gelida.
Intermedia.
Incarnata.
Catesbæi.
Ochroleuca.
Peumonanthe.
Macrophylla.

GERANIUM.
*Sanguineum.
*Argenteum.
Anemonefolium.
Macrorhizon.
Ibericum.
*Wallichianum.
Angulatum.

Pratense.
a *Album.*
b *Flore-pleno.*

GLADIOLUS.
Byzantinus.
Communis.

GLOBULARIA.
*Vulgaris.
*Cordifolia.
*Bellidifolia.
*Nudicaulis.
*Nana.
*Linifolia.

GLAUCIUM.
*Fulvum.
*Flavum.

GYPSOPHILA.
*Altissima.
*Fastigata.
*Perfoliata.
*Acutifolia.
*Paniculata.
*Steveni.
*Glomerata.
*Saxifraga.
*Repens.
*Adsendens.
*Rigida.
*Prosterata.

HEDYSARUM.
Grandiflorum.
Candidum.
Serotinum.
Paniculatum.
Viridiflorum.
*Obscurum.
Canadense.
Obtusum.
Carneum.
*Humile.
*Roseum.
*Alpinum.

HELIANTHUS.
Multiflorus.
Flore-pleno.
Atrorubens.
Trilobatus.
Parviflorus.
Excelsus.
Decapetalus.
Altissimus.
Longifolius.

HELLEBORUS.
Niger.
Viridis.
Atrorubens.
Dumetorum.
Lividus.
Purpurascens.

HEPATICA.
Triloba.
a *Cærulia.*
b *Cærulia-plena.*
c *Rubra.*
d *Rubra-plena.*
e *Alba.*
f *Nivia.*

HELONIAS.
Bullata.
Erythrosperma.
Angustifolius.

HESPERIS.
Matronalis.
a *Albiflora.*
b *Albo-plena.*
c *Purpuria.*
d *Purpurio-plena.*
e *Variegata.*
d *Folii-flora.*
Fragrans.

HEMEROCALLIS.
Flava.
Fulva.
Graminia.
Disticha.

HOUSTONIA.
*Cœrulia.
Purpuria.

HYACINTHUS.
Orientalis.
a *Cæruleus.*
b *Ruber.*
c *Flavus.*
d *Multiplex.*
e *Plenus.*
f *Albus.*
g *Semiplenus.*
Amethystinus.

HYPERICUM.
- Elegans.
- Maculatum.

IBERIS.
- *Saxatiles.
- *Corifolia.
- *Sempervirens.
- *Tenoreana.
- *Pubescens.

ILLECEBRUM.
- *Verticillatum.

IRIS.
- Susiana.
- Florentina.
- Germanica.
- Pallida.
- Flavessens.
- Sambucina.
- Squalens.
- Lurida.
- Cristata.
- Fimbriata.
- Flavissima.
- Pumila.
- Versicolor.
- Fulva.
- Spuria.
- Desertorum.
- Verna.
- Hæmatophylla.
- Xiphium.
- Xiphioides.
- Humilis.
- Nepalensis.
- Flexuosa.
- Prismatica.

JASIONE.
- *Montana.
- *Perennis.

LATHYRUS.
- Grandiflorus.
- Attenuatus.
- Tenuifolius.
- Latifolius.
- Hetrophyllus.
- Incurvus.
- Polymorphus.
- Venosus.

LIATRIS.
- Spicata.
- Pycnostachya.
- Paniculata.
- Squarrosa.
- Intermedia.
- Pilosa.
- Gracilis.
- Scariosa.
- Elegans.
- Sphæroidea.
- Turbinata.

LINUM.
- *Flavum.
- *Alpinum.
- *Diffusum.
- *Montanum.

LILIUM.
- Candidum.
- Tigrinum.
- Canadense.
- Philadelphicum.
- Catasbæi.
- Longiflorum.
- Japonicum.
- Carolinianum.
- Pumilum.
- Martagon.
- Superbum.
- Glabrum.
- Pomponium.
- Monadelphum.
- Pyrenaicum.
- Croceum.
- Latifolium.
- Spectabile.

LINARIA.
- *Cymbalaria.
- *Pilosa.
- *Alpina.
- Genistifolia.
- Linifolia.
- Vulgaris.
  - *Peloria.*

LOBELIA.
- *Erinus.
- *Amœna.
- Syphilitica.

Cardinalis.
Splendens.
Fulgens.

LUPINUS.
Arboreus.
Mutabilis.
Mexicanus.
Perennis.
Nootkatensis.

LYCHNIS.
Chalcedonica.
a *Flore-pleno.*
b *Albiflora.*
Coronata.
Fulgens.

LYTHRUM.
Diffusum.
Virgatum.
Lineare.

LYSIMACHIA.
Verticillata.
*Nummularia.
*Nemorum.
Punctatum.
Ciliata.
Stricta.
Ephemerum.

MIMULUS.
*Guttatus.
Ringens.
Alatus.

MONARDA.
Media.
Didyma.
Russelliana.
Purpuria.

MUSCARI.
Botryoides.
a *Azureum.*
b *Pallidum.*
c *Album.*
Moschatum.
Comosum.

NARCISSUS.
Moschatus.
Pseudo-narcissus.
Minor.
Tenuifolius.
Aurantius.
Incomparabilis.
Floribundus.
Poeticus.
Tazetta.
Jonquilla.
a *Flora-pleno.*
Multiflorus.

ONONIS.
Picta.
Antiquorum.

OROBUS.
Lathyroides.
Vernus.
Albus.
Varius.
Niger.
Sessilifolius.
Tenuifolius.

ORNITHOGALUM.
Fimbriatum.
Pyramidale.
Japonicum.

PÆONIA.
Moutan.
a *Papaveracea.*
b *Banksii.*
c *Rosea.*
Officinalis.
a *Rosea.*
b *Albicans.*
c *Sabini.*
d *Blanda.*
e *Carnescens.*
f *Rubra.*
Edulis.
a *Humei.*
b *Whitleji.*
c *Candida.*
d *Tartarica.*
e *Albiflora.*
f *Vestalis.*
g *Siberica.*
h *Rubescens.*
i *Uniflora.*
j *Fragrans.*
Tenuifolia.
Hybrida.
Corallina.
Dauriea.

Anomala.
Laciniata.
Paradoxa.
Pubens.
Humilis.
Lobata.
Russi.
Decora.
Cretica.
Peregrina.
Mollis.

PAPAVER.
Orientale.
Bracteatum.
Microcarpum.
*Alpinum.
*Nudicaule.

PHLOX.
Divericata.
Suaveolans.
Ovata.
*Reptans.
Carolina.
Paniculata.
Alba.
Undulata.
Acuminata.
Maculata.
Triflora.
Pyramidalis.
*Amœna.
*Subulata.
*Nivalis.
*Setacea.
Virginica.
Intermedia.

PHYTEUMA.
Orbiculare.
Elipticum.
Comosum.
Campanuloides.

POLEMONIUM.
Cœrulium.
Flore-albo.
Mexicanum.
Sibericum.
Reptans.

POTENTILLA.
*Splendens.
*Sericia.
*Aurea.
*Formosa.
*Atro-sanguinea.
*Grandiflora.
*Opaca.

PRIMULA.
Acaulis.
a *Albo-plena.*
b *Sulphureo-plena.*
c *Cupreo-plena.*
d *Salmoneo-plena.*
e *Lilacino-plena.*
f *Rubro-plena.*
g *Purpureo-plena.*
Elatior.
Polyantha.
Auricula.
Marginata.
Farinosa.
Palinuri.

PULMONARIA.
Mollis.
Officinalis.
Grandiflora.

PYRETHRUM.
Grandiflorum.
Roseum.

PULSATILLA.
Vulgaris.
Alpina.
Halleri.

RANUNCULUS.
Aconitifolius.
Platanifolius.
Amplexicaulis.

RHEXIA.
*Mariana.
*Virginica.

SANGUINARIA.
Canadensis.

SALVIA.
Interrupta.
Nubicola.
Tenorii.
Triloba.

SAXIFRAGA.
*Crassifolia.
*Cordifolia.
*Ligulata.
*Geum.

*Dentata.
*Serrata.
*Sarmentosa.
*Erosa.
*Granulata.
Flora-pleno.
*Aizoides.
*Hieracifolia.
*Pensylvanica.
*Colyledon.
*Lingulata.
*Aizoon.
*Oppositifolia.
*Geranioides.
*Irrigua.
*Ceratophylla.
*Moschata.
*Hypnoides.

SEDUM.
*Aizoon.
*Populifolium.
*Reflexum.
*Acre.
*Dasyphyllum.
*Glaucum.
*Hybridum.

SEMPERVIVIUM.
*Tectorum.
*Grandiflorum.
*Montanum.

SPIRÆA.
Filipendula.
Digitata.
Palmata.
Lobata.
Ulmaria.
Aruncus.

SPIGELIA.
Marylandica.

STATICE.
Dianthoides.
Vulgaris.
Latifolia.
Plantaginea.

STIPA.
Pinnata.

TIGRIDA.
Pavonia.
Conchiiflora.

TRACHELIUM.
Cœrulia.

TRADESCANTIA.
Subaspera.
Virginica.
Rosea.

TRILLIUM.
Sessile.
Grandiflorum.
Erythrocarpum.
Ovatum.

TRITOMIA.
Uvaria.
Media.

TROLLIUS.
Europeus.
Asiaticus.

TULIPA.
Gesneriana.
Sylvestris.
Suaveolens.
Præcox.

UVULARIA.
Grandiflora.
Perfoliata.
Sessilifolia.

VALERIANA.
Rubra.

VERATRUM.
Nigrum.
Viridum.

VERBENA.
Sororia.

VERONICA.
Neglecta.
Latifolia.
Incana.
Elegans.
*Fruticulosa.
*Saxatilis.
Arguta.
Gentianoides.
Laciniata.
Elatior.
Azuria.
Virginica.
Media.
Paniculata.

Glabra.
Spicata.

VINCA.
Herbacia.
Minor, *et var.*
Major.

VIOLA.
Cucullata.
*Multifida.
Variegata.
*Pedata.
Odorata, *et var.*
Eriocarpa.
Pubescens.
*Cornuta.
*Altaica.
Pilosa.
Lutea.
Tricolor.
*Saxatilis.

Those marked (*) are rock-plants; that is, such as are generally cultivated upon banks of rock-work.

BIENNIAL FLOWER GARDEN PLANTS.

AGROSTEMMA.
Coronaria.
Var. flo. albo.
Flo. pleno rub.
Flos-jovis.

ANTIRRHINUM.
Bellidifolium.
Majus.
Var. flora-pleno.
Fol. Varigata.
Flo. lutea.
Flo. albo.

ADLUMIA.
Cirrhosa.

ALTHÆA.
Rosea, *et var.*
Striata.
Pallida.

ALYSSUM.
Sinuatum.

ANCHUSA.
Italica.

BORAGO.
Laxiflora.

BERTEROA.
Incana.

CAMPANULA.
Media.
Var. flo. albo
Obliqua.
Americana.
Cervicaria.
Multiflora.
Thyrsoidea.
Betonicifolia.
Spicata.
Divergens.
Lanuginosa.

CELSIA.
Cretica.
Lanciolata.

DELPHINIUM.
Pictum.

DIANTHUS.
Chinensis.
Var. flo-pleno.

DIGITALIS.
Purpuria.
Var. flo. albo.

ERYTHROLÆNA.
Conspicua.

ERIGERON.
- Acris.
- Hetrophyllum.

GAURA.
- Biennis.
- Mutabilis.

GLAUCIUM.
- Flavum.

IBERIS.
- Linifolia.
- Ciliata.
- Taurica.
- Nana.

ISATIS.
- Tinctoria.
- Præcox.

LAVATERA.
- Arborea.
- Biennis.

LINUM.
- Strictum.

VERBASCUM.
- Formosum.
- Niveum.
- Macranthum.
- Spectabile.
- Elongatum.
- Rotundifolium.

HARDY ANNUALS.

ADONIS.
- Autimnalis.
- Flava.
- Flammea.

AGERATUM.
- Mexicanum.
- Cœruleum.
- Strictum.
- Latifolium.

ARGIMONE.
- Mexicana.
- Albiflora.

ANAGALLIS.
- Cœrulia.
- Indica.
- Arvensis.
- Carnea.

AMARANTHUS.
- Hypochondriacus.
- Caudatus.
- Speciosus.
- Tristis.
- Bicolor.
- Albus.

BALSAMINA.
- Capensis.
- Chinensis.
- Bifida.

CARTHAMUS.
- Tinctorius.

CALENDULA.
- Officinalis.
  - *Var. flora-plena.*
- Pluvialis.
- Hybrida.
- Stellata.

CENTAURIA.
- Suaviolens.

COLLINSIA.
- Verna.

CLEOME.
- Pubescens.
- Violacia.
- Diffusa.
- Vergata.

COREOPSIS.
- Tinctoria.

CONVOLVULUS.
Tricolor.
Elongatus.
Siculus.
Undulatus.
DATURA.
Ferox.
Tatula.
Muricata.
Quercifolia.
Stramonium.
DELPHINUM.
Ajacis.
Var. flo. pleno.
Consolida.
Var. flo. pleno.
Aconiti.
DIANTHUS.
Prolifer.
Armeria.
DRACOCEPHALUM.
Canescens.
ECHIUM.
Austerale.
FUMARIA.
Capreolata.
Spicata.
Densiflora.
GALINSOGEA.
Trilobata.
Balbisioides.
GLAUCIUM.
Corniculatum.
Var. flaviflorum.
HELIOPHILA.
Diffusa.
Digitata.
Pectinata.
HELIANTHEMUM.
Plantagineum.
Guttatum.
Villosum.
Punctatum.
HELIANTHUS.
Annuus.
Indicus.
Tubæformis.
HYOSCYAMUS.
Agrestis.
Pallidus.
Albus.
HYPECOUM.
Procumbens.
IBERIS.
Umbulata.
Odorata.
Pinnata.
IMPATIENS.
Biflora.
Pallida.
Noli-tangere.
ISOTOMA.
Axilaris.
IPOMÆA.
Luteola.
Hederacea.
Cuspidata.
Barbigera.
Purpuria.
KAULFUSSIA.
Amelloides.
LAVATERA.
Trimestris.
Punctata.
Lanciolata.
LEONURUS.
Hetrophyllus.
Multifedus.
LOPEZIA.
Coronata.
Pumila.
LOBELIA.
Inflata.
LINUM.
Gallicum.
Aureum.
Rigidum.
LINARIA.
Bipartita.
LUPINUS.
Pilosus.
Hirsutus.
Varius.
Luteus.

MATHIOLA.
- Annua, *et var.*
- Tricuspidata.
- Longipetala.

MALVA.
- Mauritiana.

MALOPE.
- Trifida.

MONOPSIS.
- Conspicua.

NEMOPHILA.
- Phacelioides.

NICOTIANA.
- Tabacum, *et var.*
- Latissima.
- Rustica.
- Glutinosa.

NIGELLA.
- Hispanica.
- Damascena.
  - *Var. flo. pleno.*
- Orientalis.

NOLANA.
- Prosterata.
- Paradoxa.

ONONIS.
- Diffusa.

ŒNOTHERA.
- Sinuata.
- Striata.
- Tetraptera.
- Pinnatifida.
- Tenella.
- Purpuria.

PAPAVER.
- Argemone.
- Somniferum, *et var.*
- Caucasicum.
- Horridum.
- Setigerum.

PRISMATOCARPUS.
- Nitidus.
- Speculum.
- Pentagonius.
- Hirsatus.

RICHARDSONIA.
- Scabra.

RESEDA.
- Odorata.

SCHIZANTHUS.
- Pinnatus.
- Porrigens.

SENECIO.
- Elegans, *et var.*

SILENE.
- Rubella.
- Quadridentata.
- Longicaulus.
- Pendula.
- Ciliata.
- Vespertina.
- Picta.
- Armeria.

TAGETES.
- Corymbosa, *et var.*
- Tenuifolia.
- Glandulosa.
- Patula.
- Erecta.
- Minuta.

TROPÆOLUM.
- Minus.
- Majus.

VIOLA.
- Prosterata.
- Tricolor, *et var.*

XERANTHEMUM.
- Annuum.
- Orientale.
- Inapertum.

ZINNIA.
- Pauciflora.
- Multiflora.
- Elegans.
- Angustifolia.
- Tenuifolia.

THE
GREEN-HOUSE AND CONSERVATORY.

INTRODUCTION.

THE green-house and conservatory may be defined to be garden structures, dedicated to the exclusive cultivation of ornamental plants, and are considered as the highest grade of horticultural erections. The former is distinguished from the latter by having all the plants portable, and generally placed on stages; whereas, in the latter, the major part are planted out permanently in beds or borders prepared for them. In the former, the plants are for the most part kept small, and in a flowering state, by frequent propagations; the end in view being more the production of abundant bloom than a display of the natural characters of the plants. In the latter, the natural habits of many plants may be developed, while at the same time the eye is delighted with a profusion of blossom in all its natural splendor, and the air perfumed with exotic fragrance. The former of these structures is by far the most ancient, and was known in this country in the seventeenth century, or even before that date. The latter is, however, of far more modern date, and, as a prominent character, possesses the advantage of being constructed on a more extended scale. Indeed, so much so, that several acres might be covered with glass, and specimens of that scenery displayed at home, which can only be enjoyed by those who visit more temperate climates. Several structures of considerable magnitude have been erected in this country; and one attempt, which unfortunately failed, (we mean the projected oriental garden at Brighton,) of carrying this species of building to its greatest

extent, would have furnished us with an example of how far this idea is capable of being carried.

Like all other structures for the habitation of plants, much has been said regarding their construction, in reference to their extent, form, the materials of which they should be formed, &c.

Of the latter, we have already, in the Introduction to the Forcing Garden, given our opinion in favor of wood superior to that of any other substitute hitherto used; we will, therefore, now proceed to consider their situation, construction, &c.

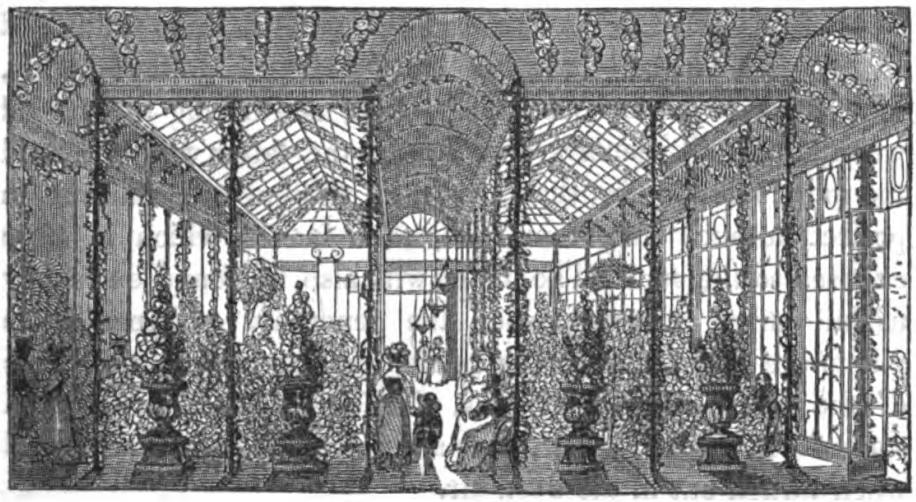
SITUATION OF THE CONSERVATORY.

The conservatory is sometimes placed in the pleasure ground, either attached to other hot-houses, or wholly apart, as the large dome-house at Britton-Hall, the seat of Col. Beaumont; and it is sometimes attached to the mansion, as at the Grange, the seat of A. Baring, Esq., M.P., where it may be said to form a part, both ornamental and useful. When attached to the mansion, it forms a lounge or promenade, at such seasons as the proprietor or his family could not so conveniently reach it, if situated at a distance; and it not unfrequently occurs, that it may be placed at certain points of a mansion with considerable architectural effect, as in the case last alluded to.

Whether the conservatory be placed immediately joining the house, or detached, it is important for the welfare of the plants cultivated in it that the situation be good, as far as regards exposure to the sun; for although the majority of exotic plants will thrive with a much less portion of sun-shine than is willingly allowed by many, still, when all circumstances will admit of it, a southern exposure is to be preferred.

The annexed engraving is a sketch of the conservatory above alluded to, the roof of which is wholly composed of metal and glass, the lights of wrought-iron rims and copper bars, being supported by cast-iron rafters, communicating with gutters or spouts of the same materials. This magnificent structure is about one hundred feet in length by fifty in breadth, the original design of which was furnished by C. P. Cockerell,

Esq., and erected by Messrs. Jones and Clark, of Birmingham.



SITUATION OF THE GREEN-HOUSE.

We perfectly agree with Nicol, that this structure should be placed in the shrubbery or flower garden, and not, as it is generally to be found, in the kitchen garden, combined with the forcing-houses. Neither should the green-house, excepting in small places, be attached to the house. The most eligible situation for a green-house is certainly in the flower garden or pleasure ground, and its exposure may be to the south, east, or west, with little difference to the plants; for, with the exception of those of the most delicate constitutions, they will prosper equally well should the house front either of those points, provided all the other points of culture be equally good: a green-house having a northern exposure would even have its advantages. *Camellias* and many other plants are found to succeed best in such situations; and it is well known, and easily accounted for, that plants in flower will retain their bloom much longer in a house so situated, than in one fully exposed to the sun.

Where the collection to be cultivated is intended to be considerable, it will be found most desirable to have two houses, even though smaller, than one very large house. The one to be exposed to the south, and the other may be either to the east,

west, or north. In the former may be cultivated all tender and delicate plants, particularly those denominated Cape plants, such as *Ericas, Pelergoniums, Diosmas,* &c., which prosper in a full exposure to the sun. In the latter may be cultivated *Cryptogamous* plants, and the majority of New-Holland plants, with thick or coriaceous leaves, &c.; and during the period when almost all plants are in flower, the latter will be found the most suitable for them, as their flowers will continue in perfection much longer in such, than in one which is more exposed to the sun. The latter will also be found extremely useful during summer, when the generality of green-house plants are taken out of the houses for the reception of some of the more delicate *Ericas, Helichrysum, Epacris,* and some other tender species, that are found not to succeed well when turned out in the open air.

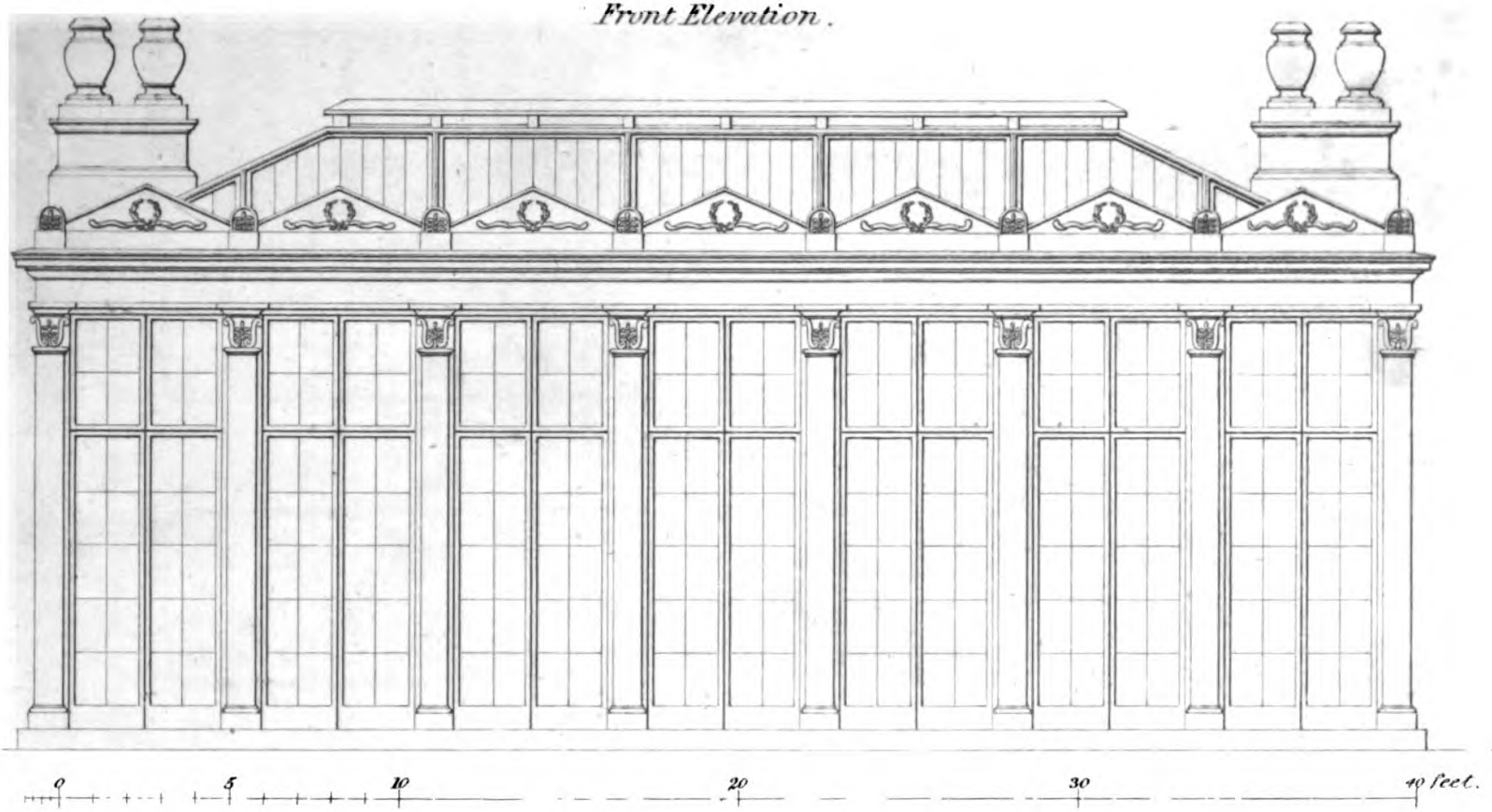
ON THE CONSTRUCTION OF THE CONSERVATORY.

It has been justly observed by one of our best practical writers on this subject, that in the construction of plant-houses, fancy may be indulged in, and a greater scope may be allowed to the taste than in the construction of forcing-houses, where one object is only in view, viz. the production of certain fruits to the utmost possible degree of perfection.

In the construction of all habitations for plants which are designed for ornamental purposes, elegance of design should not be lost sight of; and while the conservatory admits a sufficiency of light and the proper means of admitting air in abundance, the latter of which is of much importance, the size and form may be such as to harmonize with the other parts of the mansion, or taste of the owner. In the construction of the conservatory, the artist may display much architectural taste, without rendering the house by any means unfit for plants; and those structures which are erected without a considerable share of such taste, will always appear puerile and mean. That taste may be here indulged in without injury, is evident from the variety of structures of this kind erected upon different principles; and in such we have often observed the success in the cultivation to depend more upon the ma-

Conservatory.

Front Elevation.



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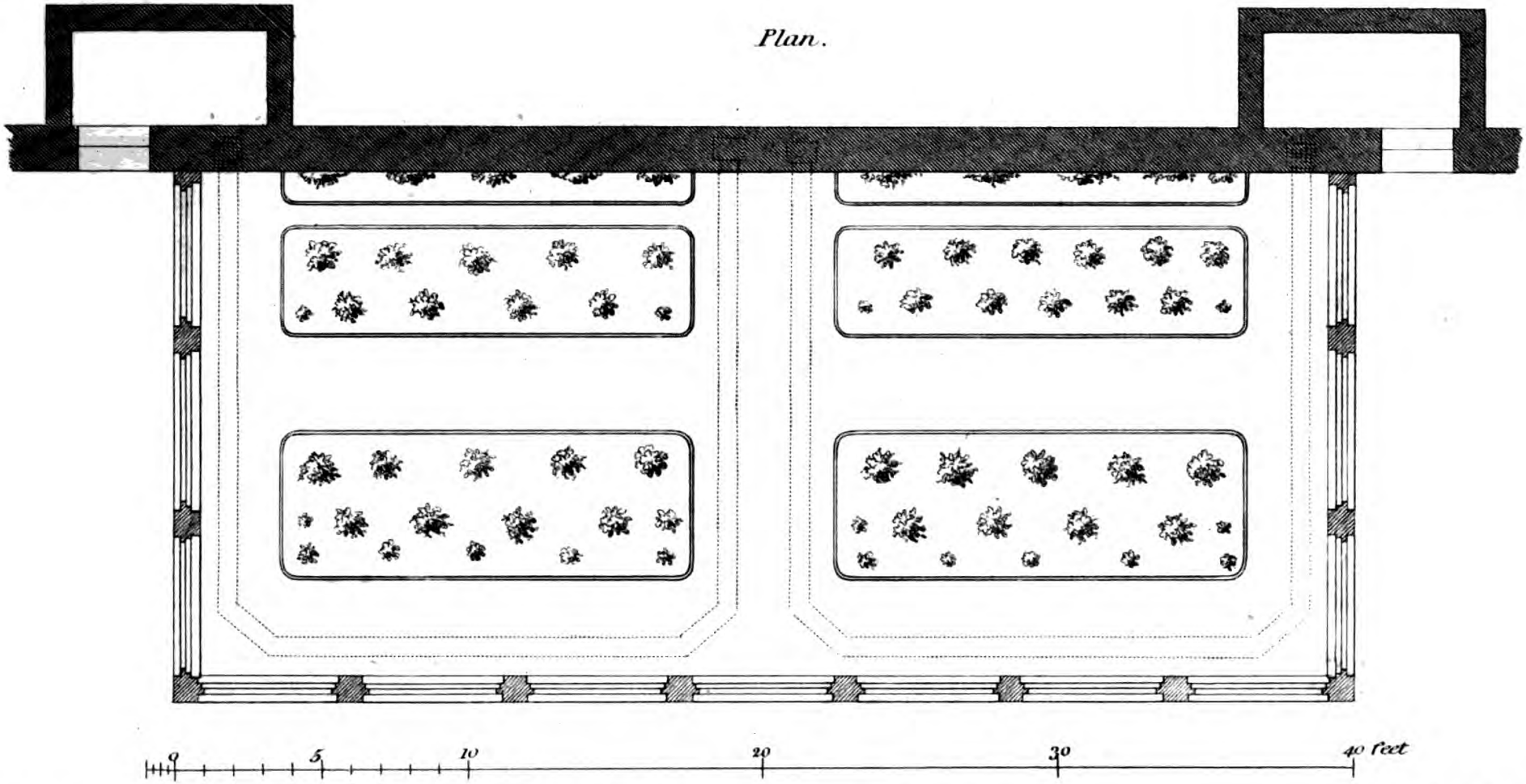
London Published by Thomas Kelly Paternoster Row. Aug.st 1.st 1828.

E. Turn

Conservatory.

Plan.



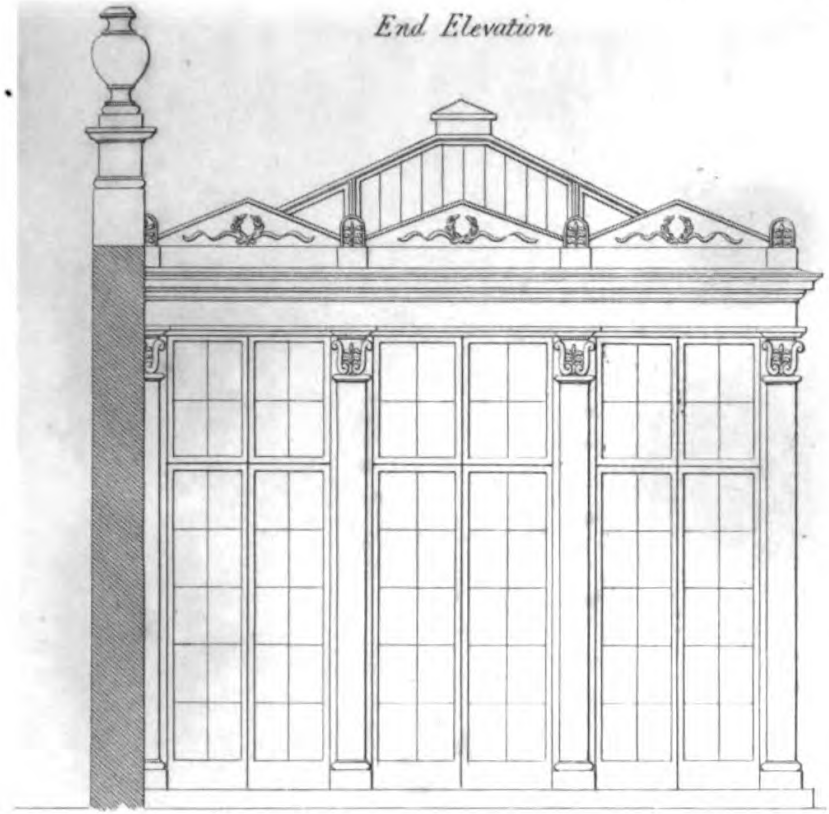
J. Douglas. del.

London Published by Thomas Kelly Paternoster Row. Oct. 1st 1828.

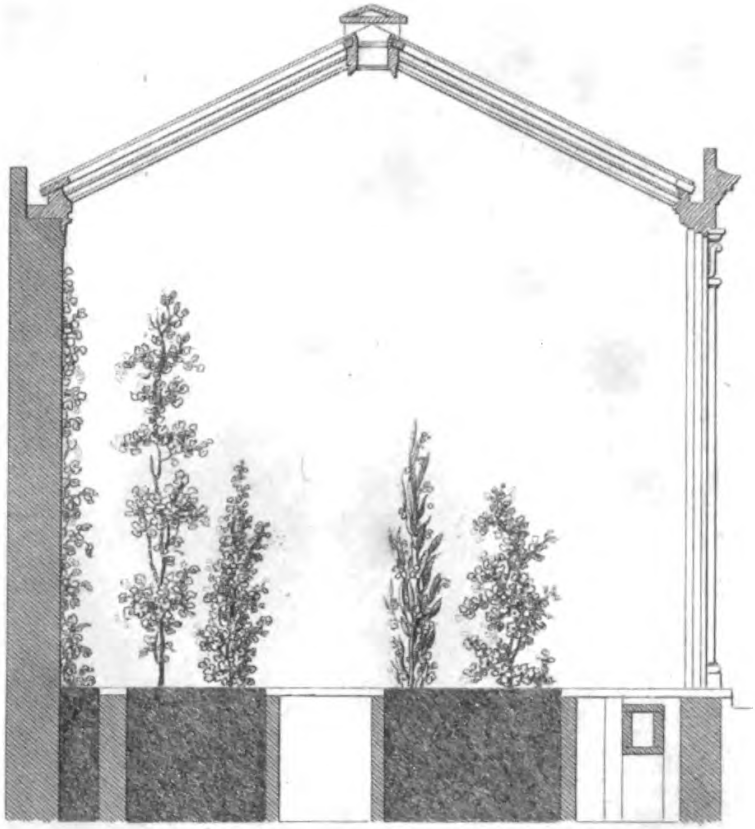
E. Turrell. sc.

Conservatory

End Elevation



End Section



0 5 10 20 30 40 feet

London. Published by Thos Kelly, Paternoster Row July 1, 1828.

Douglas Del.

E. Turnell.

nagement of the plants afterwards, than upon any particular style of the building, although it must be admitted that some houses of this kind are very defective. It is, however, always advisable, where circumstances will admit of it, to have all the sides of the house of glass, or nearly so; but as it is seldom the case, where the conservatory forms part of, or is attached to the mansion, that this can be attained; in such cases, therefore, one of the sides may be opaque, as in the case of our plate, (*see Plate,*) which represents a beautiful structure of this sort, built from the design of W. Atkinson, Esq. for P. C. Labouchere, Esq., at his seat, Highlands, near Chelmsford.

Conservatories have hitherto, for the most part, been fixed structures; portable houses, however, of this sort, have their advantages, excellent specimens of which may be seen at Cowes Castle, in the Isle of Wight, the seat of Julius Nash, Esq., where, in summer, the glass doors and lights are removed, leaving the plants to the enjoyment of free air, rain, and sun, whilst the skeleton of the structure forms a beautiful architectural piazza of considerable length. Other specimens occur, where the whole house is removed, and the beds, flues, and walks turfed over, presenting an exotic shrubbery in a perfectly novel point of view. This has been long exemplified at Nuneham Courtenay, in the case of an old orange-house situated in the flower garden, which is thus annually removed, and treated in the manner above alluded to.

In whatever style the conservatory may be designed, in regard to form, &c., it is of the utmost importance to the welfare of the plants intended to be cultivated in it, that the bottom be rendered perfectly dry by draining; and this is the more necessary, as not only the natural damp of the situation has to be guarded against, but also the superabundant supplies of water that may from time to time be applied, provision for which should be carefully and effectually made in the first erection, as it cannot be effected afterwards without much inconvenience: and unless the bottoms of the borders be rendered capable of being kept dry, little success will attend the cultivation of the inmates.

Ventilation is also of the utmost importance for the purpose of keeping the plants in a healthy state, and to prevent them

being drawn up slender, and after a time rendered naked of branches near their bottoms. If all the sashes be not made moveable, which would be advisable, it is particularly necessary that the greater part should be so made, as no means of ventilating are capable of affording air in sufficient abundance to such houses, where the sashes are entirely fixed. This is one principal objection to curvilinear-roofed houses, which can never be rendered sufficiently water-tight where the roof-sashes are moveable, without incurring an expense, which can never be balanced by any real merit that they may be supposed to possess. To those, however, who give a preference to them, we cannot recommend a better constructed roof than that called the *polyprosopic*, which is thus described by Mr. Loudon, in the Encyclopedia of Gardening:—"The polyprosopic roof resembles a curvilinear house, but differs in having the surface thrown into a number of faces, the chief advantages of which are, that by hinging all the different faces at their upper angles, and by having rods connecting the lower outside corners of the faces terminating in chains, which go over pullies in the top, or above the back wall, the whole roof, including the ends, may be raised sympathetically, like Venetian blinds, either so as each sash or face may be placed in the plane of the angle of the sun's rays at the time, or to the perpendicular to admit a shower of rain. In consequence of this arrangement, the plants in a polyprosopic house may at any time, and in a few minutes, be placed in effect, or, as far as respects light, air, wind, rain, dew, &c., in the open air; and being so placed, may, whenever desired, be as speedily restored to their proper climate." With all the advantages above stated, and important ones they are to a certainty, still the expense of erecting so complicated a system of moveable sashes, chains, &c., must be great, independently of the liability of their getting out of proper repair, or not acting in concert.

Air in sufficient abundance can be much more economically supplied, when the sashes of any formed house (curvilinear ones excepted) are made completely moveable, and let down by means of chains, or lines fixed to the top rails of each, or every other sash, and run over a pulley fixed in the back wall,

so as to admit of the sash sliding down its whole length over the one immediately below it; and admitting that every alternate top sash be thus let down, and the next bottom sash to it, let down its whole length, resting by its top rail upon the front of the house, where the front does not exceed four or five feet in height, and the bottom rail on the ground; by this means, the half of the entire roof surface will be, with little trouble, and at a comparatively trifling expense, exposed to the rain, dew, air, &c. When the front is of greater height, as is most generally the case with conservatories, then, instead of letting down the bottom sash to the ground, they may be drawn up under the top sash immediately above it, by similar means to that by which the top ones are let down. When ventilation is not to be given to its fullest extent, then the sashes may be let down to any given degree in the same manner, and having them (as a security against accidents by slipping down) secured by spring catches fixed to the side rail of the sash, and corresponding notches in the side of the rafters. Conservatories are in general loftier than any other species of hot-house, excepting those which are intended for the cultivation of palms, or similar tropical plants, which require much room. They, therefore, of themselves present very ample means of ventilation, as all the sides and ends, that are made of glass, may be so contrived as to be either removed or air admitted by half their surface, by opening the sashes in such a way as those that are fully open may cover those that remain shut; and, in addition to this, such parts of their sides as are opaque, when it does not break in on any other arrangement, may be ventilated either by glass windows or by wooden ventilators, upon the principle of those already recommended, and so placed as to suit existing circumstances. Ornamental brass ventilators, having an expanding orifice upon the outside, may be introduced into the walls when building, and may be opened or shut at pleasure; and probably they may be less objectionable in their appearance than those constructed of wood, as recommended for the culinary hot-houses.

The plants which most generally enter into the conservatory, are such as are capable of withstanding a considerable degree of cold, being for the most part natives of the Cape, New-

Holland, and such like temperatures. Fire-heat is therefore seldom required, excepting in times of frost; and indeed a greater degree of injury generally attends the application of too much fire-heat than the want of it, in the cultivation of green-house and conservatory plants. It is, however, necessary, that sufficient means be taken in the erection to enable the cultivator to apply it at his own discretion.

Fire-flues and steam have hitherto been employed in common with all other kinds of similar erections, but since the introduction of the hot-water system, there are but few who will not avail themselves of it.

In whatever way the conservatory be heated, it is of much importance that it be done in such a manner as to have the means concealed, as neither smoke-flues, steam, nor hot-water pipes, however well they be executed, are pleasing objects in such a structure; and were they less so in point of deformity; must necessarily occupy a space which would be much better employed in giving greater breadth to the borders or foot-paths. The position most generally adopted for the flues or pipes, are under the foot-paths, and the heat is allowed to enter the house through brass ventilators fixed into the pavement, although in some cases this precaution is not attended to, but the heat is allowed to find its way into the house through the pavement; a great loss of fuel must attend this latter method, and a considerable difficulty occur in heating the house quickly, which is often desirable, in order to repel sudden attacks of frost. To remedy, in a very important degree, this waste of fuel, and to facilitate the more rapid admission of heat, cast-iron grating should be used, if not for the whole surface of the foot-path, at least for so much of it as covers the flues or pipes. The expense can be no objection, for in many cases the grating is cheaper than the pavement, and it may be cast to any pattern, and sufficiently close to render it comfortable to walk on. This grating should be kept regularly painted a stone color, both to add to its neatness and durability; or, for greater elegance, the upper surface may be covered with brass, which, with a little attention to cleaning, will add much to its neat appearance. As it is cast into convenient pieces, they should be so laid down as to

enable the cultivator to have them taken up when any repair or cleaning is necessary in the flues, or for any examination of the steam or hot-water pipes.

For the greater convenience of watering, it will be proper to have a capacious and water-tight tank sunk under the border, or other convenient part of the house, into which all the water that collects upon the roof, or upon any portion of the adjoining roofs, may be conveyed, and taken up as wanted by a neat pump, which may be either placed in a niche in the back wall, or so constructed as to take off by the surface of the floor when not in use.

FORMING THE BORDERS.

Opinions are at variance on the depth that conservatory borders should be made, and it may be generally inferred that they are made too deep to answer any good purpose. However, as houses of this description are erected and planted for different purposes, the depth of the borders should be governed by the design in view.

For houses of the most capacious dimensions, and in which plants are to be allowed to attain their greatest height and size, borders of three feet of mould, independently of draining, will be amply sufficient; and for houses of ordinary sizes, when fine specimens of flowering plants are the object, borders of two feet, or two feet and a half will be quite sufficient, as the plants will flower better when not too luxuriant. For houses where a constant succession of flowering plants is required, and which would be difficult to attain without all, or at least a great portion of the plants being portable, and brought to perfection in an auxiliary house, and only admitted into the conservatory when coming into flower, and removed when they become sickly or past flowering; in such houses the borders need not be deeper than sufficient in which to plunge the pots or tubs in which they grow, so as to give the whole the appearance of being planted out. Little on this system has been done in this country, in what may be called the changeable conservatory, but it is evident that much might be done with good effect.

It is a very general complaint, that many conservatory plants become too large, and while they deprive their more delicate neighbours of all kinds of nourishment, they become themselves too luxuriant, and seldom are sufficiently prolific in bloom to merit the space which they occupy.

This is the case with the less valuable or more common kinds; to obviate which, it will be proper to have the roots of all that are of rapid growth confined within the limits of a pot or tub, and those which are of slow growth only planted out. The confinement of their roots would answer two good purposes; namely, keeping them within proper bounds, and inducing a greater disposition to produce flowers. Thus most of the strong growing *Acacias, Eucalyptus, Metrosideros,* &c., would be kept within due bounds, while the less rapid growing *Melaleuca, Banksia, Dryandria, Daviesia, Pultenæa, Polygala,* &c., if planted out, would keep pace with them, and not be liable to be overrun. In offering this proposition, we are aware that some will object to it, on the very just principle, that many valuable plants, without which a first-rate conservatory cannot be considered as complete, do not prosper when plunged in the borders, as the roots are liable to become saturated with excess of moisture, a constant evaporation from the sides of the pots being prevented from going on, and also that it is difficult to ascertain what particular plants require water and what do not. To these objections we answer, that the plants so treated are not intended to remain long at one time in such a state, but to be withdrawn occasionally, to make room for others that are coming into flower; or when they themselves are past flowering, or appear to require being again placed on the shelves of the green-house or auxiliary-house; and as to the difficulty of watering, it is but one of the very many that the cultivator has to encounter, and one that none but a very superficial gardener will reckon insurmountable.

In whatever way the borders are arranged, as far as regards the depth of soil, it is necessary that they be rendered dry at bottom, according to the directions already given for this purpose, supposing that proper drains have been made to conduct any water that might accumulate under the border to a suf-

ficient distance from the house; the whole surface of the bottom of the intended borders should be laid, to the depth of fifteen or eighteen inches, with brick-bats, flints, or broken fragments of stone, and, in placing them, they should be laid as hollow as possible, and level upon the surface.

Over this stratum of drainage should be placed one foot of turf cut from a heath or pasture, the soil being light and sandy, or if of what is called heath-mould, so much the better; this turf should be cut to the thickness of four or five inches each, and when used, placed with the green side undermost regularly over the stratum of drainage. Upon this should be placed the mould of which the borders are to be formed, to the height of six or eight inches more than what is intended for the ultimate height of the border, to allow for its sinking or settling.

COMPOST FOR THE BORDERS.

It would be inconvenient and almost useless to attempt the formation of various soils or composts for the different plants which are cultivated in these structures. It is true that some few species, which it might be desirable to introduce into the conservatory, require soils peculiar almost to themselves, and in such cases it will be more convenient to retain such in large pots or tubs, which may be plunged into the general border, than to attempt forming distinct portions for themselves. Almost all plants, which are cultivated in such structures, are found to thrive well in a soil rather poor than rich, the object in view being more the attainment of plants of ordinary bulk and flowering habits, than the attainment of specimens of their natural size, for which we have no houses in this country capable of holding, neither (it is presumed) would it be advisable to make any such attempt. The majority of conservatory plants are found to prosper well in a soil composed of half peat-earth and light virgin-loam, with a small portion of pure white sand, the latter ingredient to be added in proportion to its absence in the former, or in proportion to the richness or stiffness of the latter. No previous preparation is at all necessary if these materials be good, neither should either be

sifted, as has been hitherto too much practised; if they be broken with the spade in the process of mixing, it will be sufficient; but this latter process should only be performed while the whole is perfectly dry. Rich strong soils, as well as manure, should invariably be dispensed with, the former being unfit for the roots of most exotic plants to run freely in, and the latter encouraging a degree of luxuriance not to be desired.

PLANTING.

In planting a conservatory, it must be admitted that picturesque effect would be desirable, but from the necessarily limited space and value of the plants, this can seldom be effected, except to a very limited extent. Cultivators, therefore, for the most part, content themselves by planting in such a manner as to give the plants such a situation in the house, which is calculated to the size that each is likely to attain. With this view, the loftiest are placed next the back of such houses as are to be viewed only from the front path, and those which have a walk round them have the tallest plants in the middle of the bed; while in others, which have two beds with a passage between them, as in our plate, the more robust are placed in the bed nearest the back, and those which are the most rare, valuable, or of more humble growth, occupy the front border. This style of planting is too often carried to the extreme, and when the house is finished, the whole presents a formal and stiff outline, appearing as if the plants were shorn into a regular slope, without a single twig to break the sameness of the surface. To remedy this defect, certain plants should be chosen wherewith to form prominent objects, whose fine or curious foliage, or general character, will break the straight outline, and give a more natural as well as pleasing character to the whole.

Many beautiful exotics are indigenous to thickets and shady situations, and others will thrive under the partial shade of other plants, some of which should be made choice of to plant as underwood, if it may be so called, which will not only hide the naked stems of the loftier growing species, but also

give a denser and more natural appearance to the whole; and, in addition, exotic herbaceous plants, ferns, and bulbs, may be planted, which, with the occasional addition of a little moss, will hide one of the greatest deformities in our conservatories as they are at present planted, namely, the naked borders, which, in however good condition they may be kept, have always an unnatural appearance. A few plants of *Lycopodium denticulatum* will soon run over a considerably-sized border, and may, with very little trouble, be kept healthy and green. Other species, natives of our own woods, will prosper equally well; of these, the beautiful *Hypnum Proliferum* and *Splendens* may be named, intermixed with *Cenomyce rangiferina, C. pyxidata, C. coccifera,* &c. It has been advanced by some cultivators, that covering the surface in this way is injurious to the other plants, but this opinion appears to have been offered without a practical knowledge of the contrary; and as it is in imitation of nature, we cannot see how any reasonable objection to it can be maintained. We have had plants of the most choice, expensive, and delicate descriptions so treated, and never found any of them to be injured in the slightest degree. Some difficulty indeed presents itself for the proper selection of conservatory plants, and to obviate which, we will give in our *Systematic Catalogue* a list of plants suitable for this purpose, which may be considered sufficiently copious for general purposes. Those who plant with a view only of novelty, may be considered sufficiently acquainted with the subject as not to require any direction from a work professedly practical. It may not, however, be unacceptable to the planter of more humble attainments, if we here offer a few remarks on the sort of selection proper for conservatories in general. The two great general divisions of plants at present cultivated in these structures, are denominated, though vaguely, Cape and Botany-Bay plants, although many natives of other countries, particularly those of China and Japan are also admitted, and amongst them some of the greatest beauty and splendor. Cape plants in general are less robust in character, although equal to the others in the splendor of their blossoms; of these, a few very numerous, but at the

same time exceedingly beautiful genera, may be said to be with propriety excluded from the borders of the conservatory; these are the families of *Erica*, *Protea*, *Geranium*, including the whole natural order of *Geraniaceæ*, *Gnaphalium*, *Elichrysum*, *Mesembryanthemum*, and some others, which are found to prosper much better in pots placed on shelves, or in situations very much exposed to a free circulation of air and abundance of sun-shine. They become, however, exceedingly valuable for decorating the front parts of conservatories while in flower, and to be afterwards removed to the green-house, which may be said to be their proper habitation. Of what are generally denominated Botany-Bay plants, and which include those of New Zealand, &c., fewer exceptions are to be found. True it is, that some cultivators have laid it down as a rule, that no plants from those countries, belonging to the natural order *Proteaceæ*, will succeed if planted out in conservatory borders; this is, however, now found to be erroneous, as many beautiful specimens are now to be seen, of this description, which prosper exceedingly well.

A conservatory completely furnished with New-Holland plants, may be considered very complete, and probably, with the addition of *Camellias*, and two or three other Chinese or Japanese plants, with the magnificent *Rhododendron arborea*, from the Nepaul Mountains, may be considered the acme of perfection. The splendid collections of Mr. Mackay at Upper Clapton, of Mr. Colvil and Mr. Knight of the King's-Road, will present ample opportunities for forming a collection of these plants, unequalled in Europe.

In turning out plants from pots into the borders, care should be taken that the state of their roots and ball be examined, for unless attention be paid to this circumstance, many of them will to a certainty fail. Where the balls are hard, and the roots much matted, they should be broken, and the roots singled out considerably; for if that be not done, they will, in many cases, send out no roots into the border, and consequently, in watering, the water will pass through the light mould in the border, while the roots remaining in the old hard ball will not derive a sufficient degree of moisture;

and this evil will be daily increasing, till the ball becomes so dry that it will not even take in sufficient water for their support should even a superfluity be given to them. This occurs very frequently, and is not often detected until the plants show evident symptoms of dying, and may be considered the cause of the failures in nine-tenths of the plants planted out where this precaution is not attended to. Few plants better illustrate this circumstance than that of the beautiful family of Camellia, which make very small roots in proportion to the size of their leaves and branches, and for want of this precaution may be attributed the stinted and sickly appearance which these plants very often are found to assume when planted out; although, if attended to in this particular, few plants thrive better or continue longer to maintain their places in houses of this description. Watering at the root should be very punctually attended to after planting, until the whole borders have attained a proper degree of moisture, and until all the plants in the house have extended their roots beyond the limits of their former pasture. Afterwards it seldom occurs, excepting where the flues come in contact with the borders, that they become too dry. When the planting is finished, liberal supplies of water should be given them, not only at their roots but also over their branches, for a considerable time, particularly if the operation were performed in spring; and the borders should be carefully examined to their very bottoms frequently, to ascertain how they stand affected in regard to a proper degree of moisture. In planting, in the first instance, it will be necessary to introduce many plants to produce any degree of immediate effect, which may be from time to time removed as they encroach on those intended to be permanent, or as the latter increase in size, which, under favorable circumstances, will be the case in a few months after planting. As it may not be desirable that they should be sacrificed, and as few of them can be removed after being once established, without either sustaining injury themselves or injuring those around them, we would suggest the propriety of having all that is intended to be so removed, in large pots, which will enable the cultivator to remove them at pleasure, without much trouble or injury to those that remain.

Creepers add much to the splendor of a fine conservatory, as from the rapid growth of most of them, and the profusion of their bloom, they become highly useful in hiding disagreeable parts of the building, as well as in supplying a richness of flower and foliage towards the roof of the house, which other plants cannot be admitted to attain. In their after management much may be done by a tasteful mode of training them, so as to form festoons from pillar to pillar, or to hang in a seemingly careless confusion throughout the house. The situations where they are with propriety planted, are at the bottoms of the pillars that support many roofs of this kind of structure, or the bottoms of pilasters in the front of others, as in our plate, as well as the whole of the back wall, or other opaque parts of the house.

As to the season of planting conservatories, any period of the year may be chosen, but from February to September may be considered the most favorable.

ON THE CONSTRUCTION OF THE GREEN-HOUSE.

The green-house in general use differs little, if any, in form from that of houses for the cultivation of fruits, and considered merely as such, will answer every purpose of cultivation. However, when placed singly in the pleasure ground, or flower garden, more fanciful forms may be indulged in without any material injury to the plants.

Where circumstances will admit, it is certainly the most advisable plan to have all, or at least three sides of the house glazed, as affording more light and less shade to the plants. This cannot always, however, be the case; and when such a circumstance occurs, not more than one side, if possible, should be opaque. The late Mr. Nicol entertained more correct ideas of this sort of building than any author on gardening who preceded him, and probably nothing better can be offered on this subject than the following extract from his works:—"A complete green-house, being quite detached from other buildings," he observes, "should be glazed on all sides. In regard to form, it may be a circular, oval, hexagonal,

octagonal, or with two straight sides, and circular ends, which I think the best form of any; the next best, an octagon, whose sides are not equal, but with two opposite longer sides and six shorter sides; three and three opposite forming, as one might say, an angular oval, the ends being angular instead of round. In either of these last-mentioned forms, the stages and plants may be more tastefully arranged than in any other. Granting either of these cases, the house should be about thirty-six or forty feet long, eighteen or twenty feet wide, and ten or, at most, twelve feet high above a given level line for its floor. The parapet all round to be a foot or fifteen inches high, and the upright glasses placed on it four or five and a half feet at most. For," as he justly observes, "it is of importance for the sake of the finer kinds of plants, and in order to have all kinds grow bushy, and flower while young and small (in which state they are certainly most attractive and pleasing) to keep the roof-glasses as low as possible, just allowing sufficient head-room to the tallest person when walking in the passage." In regard to the concealment of the furnace and stock-hole, which ought to be kept from view, he further remarks:— "The furnace and stock-hole may be placed at either end or at either side, as may be most convenient, and they should be sunk under ground and be concealed. The flue to be constructed to run parallel to, and to be separated from, the parapet by a three-inch cavity, its surface being level with the top of the parapet, and being crib-trellised for heaths, Botany-Bay, and other rare plants. A walk, thirty or thirty-six inches broad, to be conducted all round next to the flue, within which to be placed the stages for the more common and the taller plants, being raised in the middle and falling to either side and end; corresponding with the glasses, though of course not so steep. A row of columns should be placed in the centre, in order to support the ridge of the roof, to which climbing-plants may be trained in various forms, and might be hung in festoons from column to column at top, or otherwise, as may be dictated by fancy. The front of the stage all round should be raised about eighteen or twenty inches above the walk, in order to raise the whole of the plants placed

on it sufficiently near the glass, thus forming the walk into a deep alley; the person walking in it having a narrow border of the finer and smaller plants on the one hand, and a bank of the more common and larger kinds on the other; than which, when the plants are healthy and thriving, few scenes can be more pleasing."

The same author further observes: "If a green-house must necessarily be attached to a wall, or other building, it might be constructed very much as above; with this difference, having one of the ends, as it were, cut off, in which case it should be placed with its circular end south, or towards that point, and the sides pointing east and west." This he considers "as the second-best constructed green-house, and in which, excepting in the above-described house, the plants would enjoy the fullest share of sun and light."

Many very complete green-houses are to be met with, the construction of which differs little from that of hot-houses in general, and notwithstanding all that has been said against their appearance, we find plants cultivated in them equal to those in houses of more fantastic forms. Of this description of house, many good examples may be seen even amongst the nursery-gardens round London. That of the large house for New-Holland plants in the Clapton nursery, and several in the nursery of Mr. Colvil, whose houses, taken as a whole, with slight modifications, would not disgrace the grounds of the most princely place in the kingdom, may be given as examples.

The HEATH-HOUSE, or HEATHERY, is a plant structure, solely dedicated to the cultivation of the beautiful family Erica. It requires to be as transparent as possible, situated so as to derive the greatest degree of sun-shine, and rendered capable of being thoroughly ventilated at all favorable seasons. Examples of this kind of structure are to be met with at Bothwell Castle, Woburn Abbey, &c.; at both places fine collections are kept up, although the house at the last-noticed place is badly constructed; and, amongst plant cultivators, that of Mr. Mackay's, at Clapton, may be considered as very complete. The leading features in the construction of this kind of house are, the

nearer the plants are placed to the glass the better, and placing them upon stone shelves instead of wood we consider to be an improvement, for the purpose of rendering the temperature at the roots more cool, or at least more uniform.

The ORANGE-HOUSE may be considered "the green-house of the last century," that is, a house with upright front sashes of glass, the roof being wholly or partially opaque. In such houses, oranges are found to thrive under good management; and, however defective, are far superior to the orangeries on the continent, where the finest specimens of this tree are to found. Although oranges prosper well in houses very much shaded, or in such as have much less light than those destined for other exotics, still they will thrive better in those that are more transparent, or in such as are capable of being partially shaded at certain seasons; we would therefore propose, for houses glazed on all sides excepting the north, should they front the south, that they be furnished with creepers of the most rapid growth, planted so as to be trained up the rafters, and, in the general management, we would recommend, that, during the hot months of summer, the whole roof be covered with them, to afford a degree of shade of which the orange, in common with some other plants, are found to thrive under. During the spring and autumn months, the sun-heat would only be but moderated; as in the former case, the creepers would not have made much progress, and in the latter they could be cut away as the sun falls lower in the horizon. During winter they can sustain no injury from sun-heat in these northern latitudes, and during that period, the creepers could be cut in, and trained so as not to cast more shade than the rafters would do without them. In offering this mode of culture, we are perfectly aware that many will disapprove of it; however, we have the test of experience to sanction us, and if all the other parts of their management be only approaching mediocrity, there is little doubt but that fine healthy orange-trees may be produced; a circumstance much desired but seldom met with in this country. It is a singular circumstance, that the London nurserymen, who excel all other cultivators in the management of plants, should either pay so little attention to the culture of this family, or be so deficient

in success. Few oranges that we recollect to have seen in the vicinity of London, are well grown, and, with the exception of some very fine ones in the collection of Mr. Knight, King's Road, Chelsea, we do not know of twenty of large size fit for sale, that have been for any length of time in the country. Few plants, when good, are so much in demand, and few produce a higher price.

Oranges thrive best when not often removed, therefore the practice of introducing them into mansions in times of fêtes, or for decorating halls, &c., is to be reprobated; few trees, used for such purposes, continue long to prosper. Even the removal of them out into the open air in summer, as is generally the case with green-house plants, is not favorable to them, unless the situation be both shaded and completely sheltered: the foliage of this family is easily injured by the cutting breezes to which this climate is so much exposed. Most of the finest trees of this kind in the country have not been removed out of the house for many years, and most of those which are annually taken out seldom present any other appearance than that of mere skeletons, having little young wood and fewer leaves.

Camellia-House. This very popular genus has certainly the most imposing effect when cultivated in a house entirely devoted to themselves, either grown in pots or large boxes, and placed on stages, as in green-house arrangements, or planted out in borders properly prepared for them in the conservatory manner. Indeed there are three genera of plants, *Camellias*, *Ericas*, and *Oranges*, which always succeed best when so cultivated; and as each genus has many species and varieties, a considerable degree of interest is to be expected from such houses during the greatest part of the year. In the construction of a Camellia-house, we may observe, that if the intention be to cultivate young or small plants, the same kind of house will be very suitable as that recommended for a green-house; and if planted out permanently in borders, that of the conservatory already described, or one nearly approaching to it, will be very complete. This interesting genus, like that of oranges, does not require so abundant a share of sunshine and light as some others, (the genus *Erica*, and most

Cape plants, for example,) at least, they are found to succeed perfectly well with a much less share of it. Houses, therefore, having much less glass in their construction, which is the most expensive material used in their erection, may be used with much propriety; and when the situation will not admit of a southern exposure, that of an eastern or western aspect may be freely indulged in. In erecting a house expressly for the purpose of cultivating Camellias, it is advisable to have it rather lofty, as the plants are seen to the greatest advantage when from six to eight feet in height, or even higher, particularly when well furnished with branches from the pot or tub upwards. While the plants are young or small, they may be elevated sufficiently upon stages so as to be sufficiently near the glass, and as they become enlarged, the stage may be gradually lowered, until ultimately they are of sufficient size to be placed on the floor altogether.

Houses for Camellias should either be so constructed at first as to exclude a certain portion of sun-shine, by being placed with their fronts towards the east or west, and in some peculiar situations even to the north, as these plants delight in shade, and retain their beautiful blossoms three times as long, when so situated, as when they are fully exposed to its influence. Shading such houses as are fully exposed during certain seasons corrects this defect, but, let it be remembered, that shading is attended with no inconsiderable expense, and has always a bad effect in garden scenery. Camellias in general flower early in the season, often in March and April; under such circumstances they perfect their flowers tolerably well, and retain them for a considerable period, in houses facing the south; but, to grow this tribe of plants in the first degree of excellence, some or other of them will flower at least ten months in the year. Those produced during the dark months of winter are in general the best, and always last the longest. Those that flower during the hot months of summer seldom perfect their flowers, and never retain them for any length of time, probably not two days. This is also the case when fire-heat is used while they are expanding their blossoms, and particularly so when fire-heat and want of sufficient ventilation are combined. Fire-heat is seldom neces-

sary to protect this plant if in a properly-constructed house, and we would say never, excepting to repel the most severe frost in winter, as it is almost sufficiently hardy to stand uninjured our general winters, when planted in any sheltered situation. However, in their culture in houses entirely appropriated for them, a deviation from this rule is necessary, when the object is to cultivate them in the first degree of excellence. When they are about to form their flower-buds, a gentle and moist heat is required, and which may be with advantage continued until their buds be completely formed, and nearly ready to expand; at which period, they should be either removed to a colder house, or, if the whole be equally advanced, the temperature of the house in which they are should be reduced to that of its natural state.

GREEN-HOUSE AQUARIUM.

The aquarium is a house furnished with suitable conveniences for the cultivation of aquatic plants; but the greater portion of them are either hardy, and consequently cultivated in the open air, or, being natives of tropical climates, are tender, and cultivated in the hot-house aquarium. Some few, however, very interesting species are from temperate climates, and are well calculated for the general temperature of the green-house. A small house for their reception is sometimes to be met with, the arrangements of which need not be different from those of the hot-house aquarium, (for which, see *Supplement*,) and the general culture being the same, the difference of temperature being understood, any further notice of it here might be deemed superfluous.

MONTHLY OPERATIONS

OF THE

GREEN-HOUSE AND CONSERVATORY.

JANUARY.

As the general treatment of the plants, in both the departments of the green-house and conservatory, during the greatest part of the year is so nearly alike, we will, for brevity's sake, consider them under the same head; but will, from time to time, as circumstances may require the notice of any particular trait in the culture of either, distinguish it separately in the course of the following monthly directions:—

TEMPERATURE.

As the majority of the plants cultivated in the green-house or conservatory are natives of temperate climates, and indeed many of them are found to withstand a few degrees of frost without any apparently bad effect, the less fire-heat that is applied to them the better. Indeed, a far greater number of plants are annually killed or much injured by too free an application of that element, than by the total deprivation of it. The mere exclusion of frost is perfectly sufficient for the majority of them; and when this can be effected without the application of fire-heat, the plants will always enjoy the best health. There are, however, some plants which cannot be well dispensed with in ordinary collections, which are less capable of withstanding the cold, and these should, if circumstances will admit of it, be placed together at one end of the green-house, where they may be more conveniently protected,

either by occasionally covering the glass nearest to them, or by being placed near those parts where the heat enters into the house from the furnaces behind, and which may be considered the warmest parts of the house. Succulent, or very tender plants, should not be allowed to stand so as to touch the glass, but be removed some inches from it. Nevertheless, they must, upon no consideration, be placed at too remote a distance from the light; for, during the months of November and December, the present, and the following month, all the light and sun-shine that they can enjoy in the most favorable parts of the house will be little enough for them, as the sun with us during these months is low in the horizon. Soft spongy rapid growing plants are more liable to be injured by frost than such as are less luxuriant and full of sap. Thus, a frost sufficient to kill the most common *Pelergonium*, or *Geranium*, will not in the least affect the most delicate *Erica*, *Banksia*, &c. The majority of plants, in almost every country, have their seasons of summer, of winter, of spring, and autumn, and however short the duration of such seasons may be naturally to them, with us they coincide nearly in the length of each, as far as relates to the latitudes in which we live. It is, therefore, improper to keep up a high temperature for such plants during the short days of winter, when the plants are, as it were, reposing for a short time, to enable them to shoot with greater vigour at a proper season. Endeavours to counteract this natural disposition in plants for the most part are attended with the most injurious consequences, and instead of benefiting the plants, only induce them to send up weak shoots and a few leaves, and consequently rendering them unfit to produce either a fine or abundant bloom. As a criterion, we may observe, that few good cultivators allow a greater range to the thermometer during winter than that of ten degrees, that is, from 35 to 45, excepting by the influence of sun-heat, and even that should not be allowed to exceed fifty-five degrees of Fahrenheit's scale.

WATERING.

Little of this element is necessary for plants in a state of inaction, and, like an excess of fire-heat, more plants are

killed at this season by too much of it than by the want of it. Some plants require none for many weeks at this season, and, as examples, those denominated succulent, with few exceptions, may be given; most of them will exist without any water from November till March, and even a much longer period. Bulbous-rooted plants require, during their inactive state, to be kept dry, as well as many others, which can alone be determined by the good sense of the cultivator.

The mould on the surface of the pots should not be allowed to become at all damp; and if they rather appear to be moderately dry, till their season of growing again return, they will be much better than if kept even so damp, as at other seasons they would require to be. As all plants take up and digest a portion sufficient for their sustenance of the food which is supplied them by the hand of the cultivator, whether it consists of liquids or solids, and no more; it therefore clearly appears, that supplying them during their inactive state with any stimulus, of which to them water is the chief, must be both erroneous and injurious. However detrimental a too liberal supply of water may be to plants at this season, it does not follow but that some exceptions are to be made, but this, like many other circumstances in horticulture, can only be obtained by observation and practice; as a rule, however, we may say, that all robust plants, and such as are old, will require more than those that are delicate and young. Coriaceous, or leathery-leaved plants, digest this element more rapidly than such as have a delicate foliage; of these, *Pittisporum*, *Camellia*, and some others, may serve for examples. In watering all plants at this season, care should be taken to spill very little on the floors or borders of the houses, and as small a quantity on the foliage as possible, as it only tends to generate damp; a circumstance to be carefully avoided, and which, if not guarded against, will be attended with the worst of consequences. There are, however, also exceptions to this rule, and these may be given as applying to plants kept in rooms, and all such as are kept in green-houses and conservatories in London, and other large cities, where, from the density of the atmosphere, and its being almost always charged with noxious gases, accompanied with smoke and soot, forms on the surface

of the leaves a coating of matter which in a short time stops the pores of respiration, and, in consequence, the plants soon die. To obviate this in a very great degree, repeated syringing over the leaves, and sponging those that are large enough to admit of the operation, will very much tend to remedy this defect. Not that such a mode of culture will enable the citizen to display so rich a profusion of plants permanently in his green-house or conservatory as the cultivator who lives at a greater distance from such an atmosphere; but we have no hesitation to say, that such a treatment will enable him to prolong the period of their existence for a considerable length of time; and, with regard to some plants, they may be cultivated with tolerable success as long as they remain fashionable, "for fashion dictates even in the choice of plants."

It may be necessary to observe, that such syringing or washing of plants ought to be performed in the early part of fine days, and as soon as the operation is performed the house should be ventilated to the fullest extent, to admit of the superabundant moisture being dispelled; and when the state of the weather is such as to render this mode of drying the atmosphere of the house impracticable, then recourse must be had to fire-heat, but which should be very sparingly applied, and sufficient ventilation given to admit of the moisture passing off in vapour. The force also of the engine, in applying the water, will supply, to a certain extent, the want of wind in such structures, and which, according to the experiments of Knight and others, appears indispensable to the majority of plants. It may appear almost unnecessary to mention, that rain or river water is always to be preferred to that from wells, at least until the latter has been exposed for some time to the action of the atmosphere. But, in this respect, London, as well as most other cities, are abundantly provided with water; and cultivators, in all situations, can command that portion which falls upon the area occupied with their house, and which should be treasured up, if soft water be scarce, or not to be had.

VENTILATING.

The admission of fresh air is an indispensable part of good culture, for, without it, the plants would soon be drawn up and naked, and many of them lose their leaves, and even die, while the more hardy would become weak, and naked at their bottoms, and devoid of colour. Where plants stand crowded upon stages, a circumstance not easily avoided when the cultivator is ambitious of the number or richness of his collection, or when, from a similar cause, they are planted too crowded in the borders of conservatories, air in such cases should be particularly attended to. In this respect, those houses which are capable of being partially removed, become of the greatest use; but all houses for the cultivation of these plants should, in their first erection, be made capable of being completely ventilated, so that three parts of the year the plants may enjoy nearly as much fresh air as if they were planted out. During this month, care must be taken that this element be as abundantly supplied as possible, for which purpose, the ventilators should be opened both at the back and front; and, in mild days, some of the sashes should also be partially opened for a few hours. However, in times of cutting frosty winds, a sufficiency of air will find its way into the most completely finished houses through the spaces between the laps of the glass, and at other crevices, to render the opening of the ventilators unnecessary. Air may be safely admitted at this season to keep the thermometer as low as 40° during the time of its admission. It may be here also remarked, that it is not altogether in the size of the spaces opened, nor the length of time that they remain open, that changes the air most completely in any structure. The difference of its specific gravity should be taken into consideration, and as that which is colder is considerably heavier than that which is hotter, and as it has been sufficiently demonstrated that the lightest or warmest air accumulates at the top of the house, it therefore follows, that when the top ventilators or the top part of the roof is opened only, the heated air will ascend by the force of its own gravity, unassisted by any other impetus; whereas, if the bottom ventilators or lower part of the house be opened only a small

space, the current of cold air flowing in displaces that which is lighter and hotter towards the middle and top of the house, and drives it out by its gravity, added to that of the former impetus. It is, therefore, more in the just regulation of the ventilators, than in the space or length of time they are left open, that the most complete change of air can take place.

GENERAL MANAGEMENT OF THE GREEN-HOUSE AND CONSERVATORY.

During this season, the plants in both these departments will require to be often looked over, and all dead leaves removed; dampness, where it appears, should be removed and counteracted by all possible means. The surface of the mould in the pots, as well as that of the border of the conservatory, should be frequently stirred up, and such plants or branches as require support, should be tied up in a neat manner, and all dead or decaying branches removed. Cleanliness should be attended to; for, besides the disorderly and slovenly appearance which a want of it betrays in the cultivator, a strict attention to it will materially aid in maintaining a healthy state in the plants. Few plants will be in flower at this season, but such as are should be placed in the most conspicuous places, so as to make as much of them as possible. Where a display of flowering plants is required at this season, it may be obtained by having in an auxiliary pit, or house appropriated for that purpose, a succession of such plants, slightly forced or retarded. To the first class may be referred, bulbs potted in September or October, and roses, lilacs, azalias, and other hardy plants, which will bear forcing at this season. These, as they are coming into bloom, should be introduced both upon the stages of the green-house and into conspicuous parts of the conservatory, and will give a gaiety by their bloom at this cheerless season, when few of the plants cultivated in either the green-house or conservatory are in flower. To the second may be referred, the later flowering varieties of *Chrysanthemum Indicum*, which may be retarded so as to be still well in flower; and many varieties of that splendid genus, *Dahlia*, which have been grown in large pots, and removed into the

house on the appearance of frost, will be still, with a little management, in fine bloom. Indeed, the latter genus is often taken up out of the natural ground, while even in full flower, and potted; after which, they continue in a tolerably flowering state till towards the end of this month.

Mignionette sown in September in pots, and protected, will now be in fine perfection, and should be disposed of in sufficient quantity to produce a degree of fragrance which at this season will be very desirable. A little artifice is necessary during the last, the present, and the succeeding month, to give a gay appearance to these departments, as after that period, many of the plants in both will be coming naturally into bloom. It may perhaps be thought going rather too far to insinuate that even artificial flowers would have a good effect at this season, but if these be well executed, they may be used, if not with propriety, at least with effect. This we believe is rather a novel idea, and, as far as we know, the practice has not been carried to any extent in this country. We have been, in conjunction with a gentleman of first-rate talents for taste and judgment in these matters, engaged in a series of experiments of this kind, which were intended to have been exemplified in an undertaking, which unfortunately, from unforeseen events, has been rendered next to abortive. However, the experiments have been carried sufficiently far to convince us of the practicability of the scheme. Of the flowers best calculated for this device, we have found the whole genus of *Camellia*, with all its varieties, to succeed the best, and have found less difficulty in getting the flowers manufactured; indeed, so close was the imitation, that very skilful judges could not detect the substitute amongst the real flowers, at three or four feet distant. Substitutes of this kind may be used for climbing-plants, which are the greatest ornament of a conservatory when in good keeping; and as they are always a considerable distance from the eye, they are less liable to detection. Should this be deemed an innovation on the horticulturist's taste, as far as regards the decoration of his green-house or conservatory, (for particular occasions,) there can be no impropriety in adopting it to any extent in the decoration of saloons, halls, or rooms, in times of fêtes or

balls, which are well-known to be great destroyers of plants; and as these are, for the most part, seen by candle-light, the illusion will be the more complete. Thus groves of *Camellias*, covered with innumerable bloom, some fully expanded, others less so, of all the forms and colors that this splendid family sports into; and groupes of oranges, laden with artificial fruit, or natural fruit fastened on the trees, and bloom, would, of themselves, be pleasing objects, and give a character to these scenes not ever to be attained naturally, and which would be accomplishing a desideratum always wished for, but never perfectly attained. Indeed, it would be difficult to say how far this idea might be carried. The *haut ton* might be enabled readily to convert their drawing-rooms into a temporary conservatory, adorned with all the varied hues of Flora, and, by artificial means, diffuse a fragrance by very simple means, both exhilarating and delightful.

PLANTS IN PITS AND COLD FRAMES.

Where extensive collections are kept up, it will be found a very necessary appendage to have one or more pits or frames for the protection of plants which are sufficiently hardy to stand our winters without fire-heat. Indeed, many of the best cultivators amongst the London nurserymen, manage to keep a great portion of their stock in such places; amongst them may be mentioned Mr. Henderson, Pine Apple Place, Edgware Road, one of the best cultivators of plants round London; and Jenkins, of the Portman Nursery. The former keeps his heaths, *Ericas*, and many other Cape and New Holland plants, in common garden frames, covered with mats, during severe weather, and few persons succeed better in their cultivation.

In all private collections, pits or deep frames will be found exceedingly useful for the protection of *Ericas*, *Hydrangea*, *Fuschia*, *Mystus*, and many others. Their principal management, at this season, consists in carefully covering them at nights, and during frosty days, with mats, straw, or soft hay, to exclude the frost, and by ventilating them sufficiently in fine weather. The principal feature in their whole winter treatment consists in keeping them as dry as possible, and free

of damp; for which purpose they should be often examined during fine days, and all appearance of damp removed or counteracted. They should stand on, or be plunged in a dry bottom of coal-ashes, or loose pebbly gravel, and should be kept clean from mosses or weeds. Dead leaves should be carefully picked off them where they appear, and the plants often turned to the sun.

Pits built of bricks, having their walls twelve inches thick, and covered with glass, will protect many species of plants for the greater part of the year, with the assistance of a covering of mats in times of frost. During severe frosts the side walls may be covered by applying a quantity of littery dung, leaves, or similar matter, not, however, with a view to give any heat of themselves, but merely to prevent the penetration of frost through them. The glasses should also be covered with double or treble mats, or with soft hay, straw, or any more convenient substitute. The mere exclusion of frost being sufficient, every means likely to attain that end should be minutely attended to. In such pits should also be wintered those green-house plants which are intended to decorate the flower garden borders in summer. We flatter ourselves that if this method of protecting plants during winter were more generally adopted, we should then see more respectable collections in the gardens of this country; but it is with this, as with many other matters connected with horticulture, depending, in a very great degree, upon the taste and disposition of the gardener. Were collections of green-house plants divided into two or three divisions, according to their relative degrees of hardness, and each division wintered in a department suited for them; and if greater attention were paid to the cultivation of the hardier species already in the country, and means used for the introduction of new plants, or re-introduction of such as have been lost in the country, that require only protection from frost, our plant collections would not be so meagre and limited as they in general are. The green-house, properly so called, should be stocked with the more rare or tender species, and probably one or two specimens of such as are doubtful, to prevent their loss during severe winters. The plant pit should be filled with those that are a degree hardier, and the cold frame, or turf pit, with the

hardiest of all, or such as are denominated frame plants. It is probable that plants would become, by degrees, under such treatment, hardier in each succeeding generation. There are some plants which now occupy a place in our shrubberies, which, within our own remembrance, were kept in the stove, the genus *Canna*, for example; and many which, within the same period, occupied a place in the green-house, are now treated as perfectly hardy, of these *Aucuba japonica*, *Pæonia montan*, *Corchorus japonica*, and many of the genus *Cistus* and *Magnolia*, may serve as examples. Most of the herbaceous green-house plants, and all bulbs usually kept there may be reckoned as amongst the most likely to stand our winters in such situations. It is to be regretted that so little attention is paid to these two last divisions of green-house plants, many of them possessing great merits when in flower; probably the want of foilage, or continued verdure during a certain period of the year, may be assigned as the cause of their scarcity in collections. Many Cape bulbs of great beauty may be cultivated with little trouble, and require no room in the green house during winter, as they are found to sustain no injury by being deposited in any dry room or loft, either in the pots, or taken out of them during the time of their inactivity. Many tuberous rooted plants may be kept in the same way.

PROPAGATING GREEN-HOUSE AND CONSERVATORY PLANTS.

As some of these produce no seeds in this country, at least many of the more valuable and scarce species, recourse is had to the various other modes of propagation, such as by cuttings, layers, grafting, budding, &c.; but of these, that of propagating by cuttings is most generally adopted, and more speedily accomplished. As all plants do not propagate by this method with equal success; some only by pieces of the old or ripened wood, others by the young shoots, while quite soft and young, different seasons, therefore, are chosen to suit the kind of plant, its state of growth, &c. For some species this month is preferred, particularly with such as remain long in the cutting-pots before they strike roots, as is the case with most hard wooded plants. By beginning thus early, the young plants become

well rooted in June, and when then potted off, are fully established in the pots to withstand the effects of the succeeding winter.

This operation should be proceeded in as the plants are found to be in a fit state, and when, as is often the case, that the plants from which the cuttings are to be taken are not advanced enough, a slight forcing may be adopted to forward them. This is often adopted with such plants as *Erica*, *Polygala*, *Indigofera*, *Crotolaria*, *Chironia*, and many others, which, if placed in the plant-stove, vinery, or peach-house for a few weeks, produce shoots very proper for this mode of propagation. It is, however, soon enough to put any of them into a state of excitement about the middle of this month; and, in that case, by the beginning or middle of next month, they will be in excellent order for the process. Those put in at this season, or even next month, for the most part strike root sooner, if not with greater certainty, if placed in a very moderate temperature; for which purpose, the pots in which they are planted should be set on a mild bottom heat, in a close frame, and closely covered with bell or hand-glasses, over which should be placed the frame and lights; the closer that they are kept, if damp be guarded against, the more complete will be the success.

This season has certain advantages superior to any other. The cultivator is more at leisure to attend to the minutiæ of this part of his charge; and therefore it is more likely to be attended to with greater regularity than at a more advanced period of the year, when the whole machine of the operations of the garden may be said to be in full action. The sun is now less powerful, and consequently less shading is necessary; and a uniform degree of moisture can be longer maintained than at any other season without the application of water, which is no unimportant trait in this branch of culture. Independently of which, all the cuttings, taken just as they begin to shoot, have the advantage of those which are put in at a more advanced period of their growth, as they have not lost any of their excitability, and are consequently better calculated for exerting their whole strength in the production of roots.

FEBRUARY.

VENTILATION.

The instructions given upon the subject of ventilation last month are applicable to the present also; but as the season will be now advancing, and the sun gaining greater power, more liberal ventilation should be from time to time given; and, as some of the plants will now be beginning to *break* or bud into shoots, this is the more necessary, to give strength to these organs while yet in their young state, to enable them to produce perfectly formed shoots and buds, without which neither handsome nor healthy plants can be expected, and, consequently a meagerness of flowers.

TEMPERATURE.

Much of what was said the preceding month regarding temperature is applicable to the present one also; but, as the sun will be now more powerful during the day, less fire-heat will be wanted during the night; indeed, if slightly covering the lower parts of the house, or those parts where the plants are nearest to the glass with mats, will keep the frost out, it will be better to dispense with fire-heat as much as possible. While the frost is kept from appearing on the under side of the glass, the temperature in the house may be reckoned as sufficient for most of the plants within it. This was the criterion always adopted by the late venerable Mr. James Lee, of the Hammersmith Nursery, a name so associated with plants, and so well known and remembered throughout Europe, as to stand in need of no praise from one of his numerous pupils, and may be considered as a safe and simple rule to go by.

WATERING.

As some of the plants of the earliest habits will now be beginning to spring, water may be given to them in rather larger

quantities, still however by no means too liberally; as, although this very necessary stimulus is indispensable to them at this period, a superabundance of it would be extremely injurious, and would not only, as it were, cloy them, but also keep their roots in a state unfavorable for affording the necessary food for the growth of the plant. Those that as yet show little or no signs of vegetation, should be, as recommended last month, kept rather dry, at all events till towards the end of this, or the beginning of next month.

GENERAL MANAGEMENT OF GREEN-HOUSE AND CONSERVATORY PLANTS.

These plants will require to be often looked over, and all decayed leaves and branches cut or picked off as they occur. The surface of the pots in the former, and that of the bed in the latter, will require to be often stirred up to prevent the growth of moss, as well as to prevent the generation of damp. Supporting the plants where they stand in need of it, and turning those which are portable in the latter, and all of those in the former, is an indispensable trait in their culture at this season; for, if left long in the same position, the sides which are the most shaded, or farthest from the light, will become naked and leafless, and ultimately render them very unsightly.

In the progress of this work we have frequently noticed the erroneous practice of what may be termed a general shifting or repotting of plants; nothing can be worse in practice, particularly in the cultivation of tender exotics. All plants do not begin to vegetate at the same time, nor do they all alike decompose the food supplied them at their roots. Some rapid growing species will exhaust the mould in the pots in a few weeks, while others that grow less luxuriantly will subsist for several years upon the same body of mould. These things being taken into consideration, the repotting should be regulated accordingly. Some plants will now be beginning to vegetate, and therefore they should be examined; and, if in need of larger pots, or even of fresh mould in the same sized pots, which is often necessary, as it is always desirable to have plants in as small pots as possible, they should be attended to at

this season. Green-house and conservatory plants, like all others confined within the limits of a close atmosphere naturally (even under the best management) become drawn, as it is technically termed, that is, naked of branches near their bottoms, and often become sickly and diseased; such, therefore, should be headed or cut down to a proper height, making choice to cut at such parts of the stem or stronger branches as are most likely to produce young shoots wherewith to form the future habit of the plant. Many plants, with a little management, may be remodelled, as it were, by this means, even after having become very unsightly; and, as far as regards conservatory plants permanently planted out, is the only method of keeping them in proper form. But, in regard to green-house plants, properly speaking, as they are seldom required to be of large size, a more eligible practice will be found in annually propagating and keeping up a young stock, so that when any of the plants become sickly, or are drawn up weak, or otherwise deformed, they should be thrown away to make room for young plants propagated the preceding season either from seeds, cuttings, or other means. Many families of plants are thus cultivated only for one season or two, and then thrown away; and by such management only a healthy and handsome green-house collection can be expected. When green-house plants are headed down, it is, in most cases, necessary at the same time to shift them also; and, at this early season, those so headed down should be placed in a moderate heat for a fortnight or three weeks to excite them to break stronger and more regularly into shoots. Care, however, must be taken that they be not placed in too high a temperature, for that would defeat the end in view. Conservatory plants require great attention, as far as regards pruning and training, and this is a very proper season for this operation. Pruning of such plants depends upon so many circumstances, that no fixed rules can be laid down; it may, however, be premised, that, as abundance of blossom is desirable, attention should be paid to produce a flowering disposition, as far as can be attained. The natural character or habit of such plants is also a desirable point to be attained in their management, and it is, therefore, one which the cultivator should study carefully. All dead or ill-placed shoots should be re-

moved, and when valuable or scarce plants become crowded by those less valuable or choice, the latter should be cut away by degrees to make room for them.

At this season also, conservatory climbers should be examined and pruned, so as to produce shoots in such situations as it may be desirable to have covered; a general regulation of them should also now take place; and where any have died, or are in a sickly state, their place should be supplied with young plants, for which abundant provision should be made by having, at all times, a sufficient stock of young ones for the purpose.

ORANGES.

The orange being a native of India and China, although successfully cultivated in the warmer parts of the South of Europe, requires with us the protection of glass, at least for three parts of the year; and some cultivators, as we have elsewhere remarked, keep them always under cover; and such is our view of the subject, that to have this tree both healthy and fruitful, it should remain always in that state. However, some cultivators manage to cultivate this tree, who adopt a different practice. In some parts of Devonshire it has been found to succeed in the open air, and trees are there pointed out that have withstood the winter for more than a century, and producing fruit as large and fine as any from Portugal. We may also here remark, as a proof of the doctrine first laid down (if we mistake not) by that valuable patron of horticulture, P. Neil, Esq. of Edinburgh, that plants originated from seeds ripened in the open air of this country, are most likely to produce a progeny of hardier habits, and of all are the most likely to become acclimated in this country. This is asserted to be the case with the orange trees in Devonshire; and we know from observation that it is the case with many other exotics. Professor Bradley, in describing the large orange trees, which once grew at Beddington, in Surrey, says, that they always bore fruit in great plenty and perfection; and that they grew on the outside of a wall, not nailed against it, but at full liberty to spread, and that they were fourteen feet high, twenty-nine in-

ches in circumference at the trunk or stem; and that they covered above one hundred square feet of wall. These trees, after having stood in the open air for a great many years, were killed at last by the severe frosts in 1739-40. As the cultivation of the orange, and its associates the lemon, citron, lime, &c., is probably less understood generally than any other exotic fruit-bearing tree in our gardens, we will here deviate somewhat from the general plan of this work, and detail the practical observations of several of the most successful cultivators of this fine family, together with that of our own practice, in this place, instead of dividing these observations in their monthly order.

Oranges, like most all other fruit-bearing plants, are propagated from seeds, which ripen perfectly with us, as well as from the seeds of imported fruit. Varieties are thus produced; but as it is seldom the object of the British cultivator to originate new or improved varieties of this tribe, the young plants so produced are most generally intended and used for stocks, on which to bud, inarch, or graft approved varieties, which have been already cultivated. The seeds may be sown at any period of the year when they may happen to be procured, or they may be kept for several months with little difference as to the ultimate success. From the beginning of February to the end of September, however, may be considered the most eligible season for this purpose. As it is a principal object to have strong stocks, a preference is generally given to the most robust growing kinds; and we find Miller, one of the earliest cultivators of this tribe, preferring those of the citron, and several more modern propagators agree with him in this point. We have, however, often taken seeds of any of the tribe that were the most readily met with, and our success has been complete. We have, however, preferred the seeds of imported fruit, and those of such as have become rotten in the warehouses; and if they be sown in rich light mould, about the end of March or beginning of April, and placed in a mild bottom heat, and kept rather moist and close, they will soon vegetate. The back of a melon or cucumber frame is a good situation for this purpose. When the seeds vegetate, they should have abundance of light, and the sun, at that early period, will not

be too powerful for them; but for such as are originated at a more advanced period of the year, we have invariably shaded during the hottest hours of the day. When the plants are of sufficient size to pot off, which they will be in the course of three weeks after sowing, they are then potted into small sixties, one plant in each pot; the mould used being rather richer and stronger than that into which the seeds were sown. When potted off, they should be placed in a close frame, with a genial bottom heat, the atmosphere of which may stand at from 55 to 60 degrees of Fahrenheit's thermometer during the night, and a few degrees of rise allowed during sun-shine. As the season advances, shading from the full sun should be attended to, and a moist genial steam kept up in the frame, which will be obtained while the bottom heat is sufficient, by watering the plants over head in the afternoon, and shutting up the frame closely. Air must be regularly admitted to prevent the plants from being drawn up too weak, particularly while the bottom heat is strong. Occasional applications of liquid manure should be given them once a week, but care must be taken in the application that none of it fall on the leaves of the plants.

With good success, in four months the plants will be from eighteen inches to two feet in height, and may be immediately operated upon by grafting, or shifted into larger pots, and kept in a moist mild heat till autumn, when they may be gradually hardened and placed in the green-house or orange-house till wanted for stocks. When strong stocks are, however, desired, and when trees with tall stems are the object in view, they may, early in the following spring, be placed in a moist bottom heat, and cultivated for another season, as already directed, taking care that the leading shoot be not injured, nor any superfluous side shoots allowed to remain on them. By the second July after sowing they will be in good condition for budding. When stocks are used the first season of their growth, we have succeeded by grafting them, when about the thickness of a quill, in the following manner:—Young shoots of a favorite variety are selected, being rather smaller than the stock, and about four or six inches in length. The stocks are prepared for them by taking a thin slice off one side (at about half their height,) just merely to remove a very small portion of the

wood; the graft is prepared in like manner, by merely taking off a thin slice of it; they are fitted together in the usual manner, and fastened with fresh matting, which is wound round the stock, from about an inch below the union, and carried up about an inch above it. No clay, but only a little fine moss, is used to envelope the part operated on, and kept constantly moist. The head or leading shoot of the stock is not now shortened, but left growing until some weeks after the union is ascertained to be complete; it is then headed down, as close to the part of union as convenient, but not too close, for fear of displacing the graft. The remaining piece of the stock is removed some months after the graft is established, and, if carefully done, the part of union will, in a few months longer, scarcely be visible. When the operation of grafting is just completed, the plants are placed under close hand-glasses, within a hot-bed frame with a good heat, and seldom removed until the union be complete, and that only to give a little water. By this process we have had many fine orange plants from two to three feet high, and often covered with bloom within two years, from the day of sowing the seed.

The late Cushing describes a somewhat similar method of grafting, in his *Exotic Gardener*. "Form the scion as for the common whip-graft, and then, without taking off the head of the stock, cut from the clearest part of its stem an equal splice as smoothly as possible; do not tongue the scion, but tie it on neatly and firmly with matting and clay, in the manner of a graft; plunge them in a hot-bed, and cover with a cap-glass till the scion begins to grow, and then cut away the top of the stock, and remove the matting by degrees." Nairn, in a communication to the Horticultural Society, details the following as his practice:—"Let the operator select as many orange or lemon stocks as he wishes to work, and place them on a moderate hot-bed for a fortnight, by which time the sap will have risen sufficiently to move the bark; the stocks must then be cut off, about two inches above the surface of the pot; and an incision made with a sharp knife, similar to what is done for budding, separating the bark from the wood on each side. Let the scion be cut thin, in a sloping direction, and thrust between the bark and wood, and then bound tight with woollen yarn; but

very great care must be taken in binding to prevent the bark from slipping round the stock, which, without attention, it is very apt to do. After it is properly and neatly bound, put a little loam or clay close round the stock, to the surface of the pot, then, with a glass of a proper form (a figure of which he gives) to prevent the damp from dripping on the scion, cover the whole, and press it firmly into the mould, to prevent the air or steam from getting to the plant; the glass must not be taken off, unless you find any of the leaves damping, and then only till this has been remedied, when it must be immediately returned. The stocks must next be placed on a brisk hot-bed of dung, and, in about six weeks, the glasses may be taken off, and the clay and binding removed; but it will be necessary to bind on a little damp moss in lieu of the clay, and to keep the glasses on in the heat of the day, taking them off at night, when, in about three weeks or a month, they will be fit to put into the green-house, where they will be found to be one of the greatest ornaments it can receive. I should recommend," he observes, " the Mandarin orange for the first trial, as the fruit is more firmly fixed than that of any of the other sorts," for, by this method, he has successfully performed the operation with not only the flowers, but also the fruit upon the scion, and has had no less than seven oranges on a plant, in a pot of the small sixty size.

That successful cultivator, Henderson, of Wood-Hall, details his method of grafting the orange tribe as follows:— " Take two-year-old wood, cut into lengths of about seven inches; if the stock be much thicker than the graft, cut a piece out of the stock of a triangular figure, about an inch and two-eighths in length, regulating the depth according to the thickness of the graft, and keeping it square at the bottom. Displace two leaves at the bottom of the graft, for the convenience of getting it put on; cut the graft right across under one eye where a leaf has been taken off; dress the graft to fit the receptacle made in the stock, observing to keep the lower end of the graft equal in thickness as above; always let three or four leaves remain untouched on the graft. After the graft is fitted in the stock, tie it up with bass matting, and put clay round it. If the grafts and stocks be nearly of the same

thickness, cut the stock at right angles, nearly half through. Cut off the piece, keeping it equal at top and bottom; cut the lower end of the graft right across under an eye, and with a knife prepare the graft to fit the stock. When the grafted plants are tied up and clayed, set them at the back of the vinery or peach-house, observing to keep them away from the flues, as fire-heat is hurtful to them at first; cover them with hand-glasses, or, if a frame can be spared, it is still better. Shade them every day, but take the mats off at night; continue the shading till they have begun to grow, when they may be exposed to the light. If any stock happens to be so tall and thick that it cannot be placed under a hand-glass or frame, put two or three grafts on it, set in any convenient place in the house, and shade it with mats: it will succeed perfectly in this way; the grafts lose none of the old leaves; and, in five or six months, they will make three or four young shoots, six or eight inches long; these, with the leaves that were on the grafts when put on, form a well-clothed little plant."

Orange-trees are also propagated by budding, either when the stocks are young, or when they are even of considerable size. Handsome plants may be formed by this method when young stocks are used, but this cannot be the case when the stocks have attained a large size; and hence arises a great defect in many of those that are annually imported into this country from France, and particularly from Italy, &c., where the stock operated on is often from one to three inches in diameter at top, and, in consequence, seldom forms a union so complete as to conceal the amputation of the stock. When this species of propagation is had recourse to upon small stocks, a deep frame will be found a suitable place, both that the plants may be conveniently shaded, and attended to till the bud be fairly established. From the time that the bud is inserted, until it be completely taken with the stock, air in a moderate quantity should be given; and if the operation be performed during the hot months of summer, the frame should be placed so as to have a northern exposure, or be partially shaded, but not under the drip of trees. The period that elapses from the time the bud is put on till the union takes

place, depends a good deal on the state both of the stock and bud, but four or five weeks, under ordinary circumstances, will be near the truth. Those which appear to have taken at the end of that time, should be gradually untied, and kept well supplied with air and water, and occasional shading, till the end of summer, when they should be taken into the orange-house or green-house for the winter. In the following spring the stocks should be headed down to about two inches above the bud, and placed, by the first week in March, into a mild bottom-heat, and kept in a humid atmosphere. Great care should always be taken in applying bottom-heat to this tribe of plants; for, although they will sometimes appear to stand a considerable degree of bottom-heat, still more injury is done by too much of it than too little. The summer after budding, they should be kept in a growing state; and, if ordinary success have attended the process, they will, by the beginning of August, be plants of a considerable size. From that time till the middle of October, they should be gradually exposed to more abundant air and sun-shine, to ripen or harden the young shoots of the season, to enable them to break strong the following year. When the cold evenings set in, they should be removed to the orange-house or green-house, where they are henceforth to remain.

Propagating oranges by cuttings, as far as we can ascertain, is comparatively a modern improvement in their culture, and has been proved most successful by several cultivators of late years, and we find it recommended by correspondents both in the Transactions of the London and Caledonian Horticultural Societies. In the latter, that very able cultivator, Henderson, of Wood-Hall, gives the following as his practice, and considers it by far the most expeditious method of procuring handsome plants:—

"Take the strongest young shoots, and also a quantity of the two-year-old shoots; these may be cut into lengths from nine to eighteen inches. Take the leaves off the lower part of each cutting to the extent of about five inches, allowing the leaves above that to remain untouched; then cut right across, under an eye, and make a small incision, in an angular direction, on the bottom of the cutting. When the cuttings are thus prepared, take a pot, and fill it with sand; size the cuttings,

so that the short ones may be altogether, and those that are taller, in a different pot. Then, with a small dibble, plant them about five inches deep in the sand, and give them a good watering over-head, to settle the sand about them. Let them stand a day or two in a shady place; and, if a frame be ready with bottom-heat, plunge the pots to the brim. Shade them well with a double mat, which may remain till they have struck root; when rooted, take the sand and cuttings out of the pot, and plant them into single pots in the proper compost. Plunge the pots with the young plants again into a frame, and shade them for four or five weeks, or till they have taken with the pots; when they may be gradually exposed to the light. From various experiments, I found," he says, "that pieces of the two-year-old wood struck quite as well; and in place, therefore, of putting in cuttings six or eight inches long, I have taken off cuttings from ten inches to two feet long, and struck them with equal success. Although I at first began," he observes, "to put in cuttings only in the month of August, I now put them in at any time of the year, except when the plants are making young wood. By giving them a gentle bottom-heat, and covering them with a hand-glass, they will generally strike roots in seven weeks or two months. The citron is most easily struck, and is the freest grower. I therefore frequently strike pieces eighteen inches long; and as soon as they are put into single pots, and taken with the pots, they are grafted with other sorts which grow freely."

In regard to the precise season of grafting, or putting in cuttings, this excellent cultivator observes he is not particular.

Hawkins, in Hort. Trans., describes a method of propagating this family by cuttings, the principal feature of which appears to be, his placing his cuttings so that their base or lower end may rest exactly upon potsherds, placed for the double purpose of draining and facilitating the production of roots. Other cultivators propagate sometimes by selecting the young succulent shoots as soon as they are done growing, which they plant in well-drained pots of light sandy loam, and which they cover with a bell-glass, and set in a gentle bottom-heat. The success of this method is ascertained in about two months, when the cuttings will either have struck root or rotted off.

Some prefer taking in spring the shoots of the previous year's growth, which they plant in pots, as above, and cover with glasses in like manner; but instead of putting them immediately in a bottom-heat, they prefer plunging them in a cold frame, where they remain three or four months in an apparently inactive state: at the end of that time, part of them will have formed that callous excrescence at their base which forms on most plants previous to the emission of roots, and such as have not this appearance at their base, have little chance of succeeding. During the following winter they are kept in a low temperature, and in the ensuing spring are placed in a moderate hot-bed, where they push freely, and become good plants.

Laying, as a mode of propagating oranges, has been tried, but not to any extent, so far as we know, in this country, although it be not unusual on the continent. This is the less to be regretted, as plants of any kind so produced seldom make fine trees; and as the other methods of propagation are so successfully and easily accomplished, we cannot recommend the adoption of a process so unlikely to answer the end in view. As inarching is a species of grafting, or what is called grafting by approach, this family may be successfully increased by that means, and although we have not observed it in practice, we think it very probable that orange-trees may be increased in size by inarching several pretty large plants on one stock, as is done to a certain extent in the cultivation of *Camellias;* at least the idea appears feasible enough to deserve a trial.

Orange-trees are sometimes propagated from seeds, not altogether with a view to obtain stocks, but also for the purpose of remaining in their natural state, and instances occur of their coming into a fruit-bearing state, while of a small size and of only a few years growth: this we learn from a communication in the Transactions of the Botanical and Horticultural Society of Durham, Northumberland, &c., to be practised by Mr. Gray, of Belsay Castle, who details his mode of culture as follows:—"I have at present," says he, "a seedling lemon-tree, with upwards of forty green fruit on it, likely to swell to a great size; those which are engrafted or budded, I observe, come sooner to a bearing state, but are

never so healthy trees as seedlings. I find I can bring a seedling orange-tree into bearing in six years. I have observed the young seedling-trees to put out thorns at the base of the leaf, and so long as these appear on the young wood, no fruit can be looked for, as the tree is in too luxuriant a state." To correct this luxuriant habit, he uses the following compost:—"Mix half strong brown loam, half peat or heath earth, well together, with a little gravel to keep the soil from binding to the roots; have pots proportionable to the size of the tree; put them into this soil, which he considers rather poor, but it keeps them in good health and in humble growth: by this management they come sooner into a bearing state. He keeps them in that soil till he sees blossom appearing, which may be looked for when no thorns push out of the young wood. After that he gives them larger pots; then takes compost, half strong brown loam, half vegetable mould; breaks some bones small, mixes some in the compost, and puts some in the bottom of the pots, in order to feed the roots a greater length of time, and drain off superabundant water." He proceeds to detail the following very rational mode of after culture, which is exactly corresponding with our own views of the case, particularly as regards heading down the trees:—"In pruning orange-trees, care must be taken not to shorten any young wood, as the flower generally appears at the extremity only, cutting out any cross useless wood." He very justly condemns the practice of annually heading down orange-trees, and observes, "by that treatment it is impossible for trees to bear fruit, for in spring they bring forth strong thorny wood, and are no nearer bearing fruit than when only one year old."

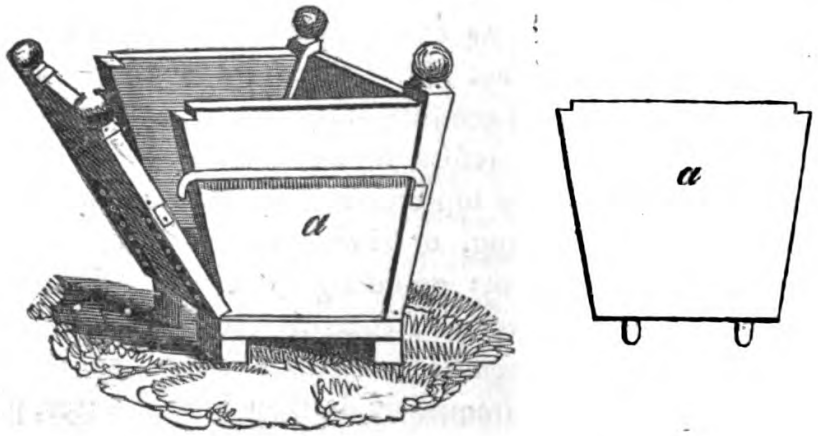
The orange, like most other plants, has its peculiar insects, who often commit sad devastation on them; and, in common with most every plant, is much infested with *Aphides*, particularly on the young shoots and leaves. These latter are, however, easily got rid of, as a powerful fumigation of tobacco will destroy them without the least injury to the tree. The insects which are by far more to be dreaded, are of the *Coccus* genus, and not unfrequently several species may be detected upon the same tree. As these insects seem to stand fumigation with impunity, nothing from the ordinary modes of this

application can be expected capable of destroying them. The application of ammonical gas, however, may be considered as an efficacious antidote, but the generation and application of that gas are not yet sufficiently understood by practical men to be brought in as a remedy against these insects. Washing the leaves often with a pretty strong lather of soft soap, applied with a sponge or soft brush, is very effectually used for their suppression; and although it be a tedious method, it has the merit of being effectual. In regard to shifting oranges, we suspect that as much injury is done by a too frequent recurrence to that practice as almost by a total neglect of it, as fine oranges are to be met with which have not been shifted for many years. The necessary supplies of nutriment which they require, should therefore be applied in form of liquid manure, or by frequently top-dressing the surface of the pots or tubs with sheep's dung, or similar stimuli, which will be carried down to the roots gradually by each watering. The continental orange-cultivators frequently grow them in boxes, in which they are allowed to remain until the box becomes quite rotten, and not unfrequently do they, in such cases, place the rotten box within one of larger size. The decomposing wood, they conclude, supplies the plants with a constant supply of food, somewhat similar to the vegetable-mould which most cultivators use in forming compost for these trees. Broken or pounded bones, horn, and similar matter, appears useful for a like purpose, and such is very often practised with some of the best cultivators in this country.

As a very necessary precaution in planting oranges in pots or boxes, where they are thus to remain for several years, too much care cannot be taken in draining them well, as, if not done in a proper manner before the plant be put in, it cannot be done afterwards, and, if superficially done, will be attended with the worst consequences. For, although the whole orange tribe require at certain seasons a large supply of water, and always appear to thrive best in a damp humid atmosphere, still they are very impatient of too much wet at their roots. We have already observed, that this family do not require much fire-heat; a cool equable temperature is what we have observed them to succeed best in. Abundance of water, par-

ticularly in the growing season, partial shading from the meridian sun, and being not exposed to the external effects of our climate, seem all that is necessary in producing trees as fine as those to be met with in such places on the continent, where they are not cultivated in the open air.

The annexed engraving represents an orange-tub of our own invention, differing from Sir A. Hume's, or those used on the continent; and their particular make, as they taper a little, gives them a lighter appearance than when made square. The



advantage that this sort of box possesses over those in common use, is, that they may be taken to pieces with very little trouble; the roots of the trees may be examined; the old ones removed, and replaced by fresh mould; the roots may be pruned, and it may be immediately ascertained whether they be in a proper state as regard moisture, &c. The last particular we consider to be very material to their health; and as the sides fold down, the inside of the boxes may be painted or pitched as often as it may be judged necessary; and if this point be properly attended to, and the boxes be made of good wood, they will last above twenty years. Another great advantage which they possess over the boxes alluded to, is, that the trees may be taken out of one box and placed in another without taking them to pieces, which cannot be effected with the others, as they are made of strong framed posts, so joined that it is impossible to take out the trees; independently of which, only two of their sides are moveable. In taking this box to pieces, it is only necessary to pull up the two iron bars,

and by quietly pulling out two of the sides, the remaining sides (*a*) lift up. It is our general practice to fill the bottom of the tubs with broken bricks, tiles, and turf, for draining, so as to be level with the top of the bars.

PROPAGATING GREEN-HOUSE AND CONSERVATORY PLANTS.

The plants put into a mild temperature, as recommended last month, with a view to produce young wood for the purpose of making cuttings, will be by the middle of this month in good order for that purpose. Most of them will be so, when they have attained the length of from two to four inches, according to their kinds. Pots should be had in readiness for their reception, by being perfectly drained, and filled with mould proper for each respective plant. The majority, however, strike root in pure white sand, into which the cuttings are planted without any other mixture whatever. When the cuttings are taken off the mother-plant, they should in all cases, excepting such as bleed very much, (as most species of *Euphorbias* and other *Lactiniferous* plants, which discharge a quantity of white milky blood or juice,) be planted as soon after taken from the plant as possible. In preparing the cutting, a very sharp knife only should be used, wherewith to cut off all the leaves as close to the stem as possible, without wounding it, as far up the cutting as it is intended that it should be placed in the sand or mould, leaving a few of the top leaves entire, for the necessary purpose of allowing the free respiration of the plant to go on. This observation is particularly directed to all evergreens, whether tender or hardy, and a want of attention to it seems the principal cause of the failures that occur in propagating that denomination of plants. It may be laid down as a rule, from which there are few exceptions, that no cutting should be deprived of all its leaves, neither should they be shortened, although we daily see it practised. When sand is used to plant the cutting in, it should be first pressed down tight into the pot, and afterwards well watered previously to the cuttings being put in; and if water be applied after they are planted, with a view to settle it round their stems, the glasses should not be put on

them until the leaves are again perfectly dry. Neither should the depth of sand be more than just equal in depth to nearly the length of the part of the cutting inserted in it.

PLANTS IN COLD PITS OR FRAMES.

Air should be freely admitted to the plants on all favorable occasions, and the process of covering carefully attended to, for we have often very severe frosts during this month. Clearing them of dead leaves, dampness, and turning them about towards the sun, must be also attended to.

Some of course will have been destroyed, from particular causes, during the winter, and when such is the case, they should be removed, when it is accurately determined, which will give more room to the remainder, and allow a better circulation of air to pass through them; independently of which, it will give a better appearance to those which remain. It very usually happens that, from want of proper draining, or other causes, the water given them does not pass freely through the balls, but stagnates about the roots; and when such cases occur, the plants should be taken out and repotted as soon as they are observed to be in that state. Those plants which are intended to be extensively increased, for the purpose of planting out in the flower garden, should be selected and placed in a mild hot-bed, to set them into a growing state, in order that cuttings may be sooner obtained of them, so that the young plants, so originated, may be strong enough to plant out in the borders, as soon as the season will admit of it.

MARCH.

TEMPERATURE.

Unless in unusually cold weather, little or no fire-heat will now be required in either of these departments, and that little only must be applied on evenings when there is an obvious appearance of frost; or sometimes in the morning early, when unforeseen frost may have partially entered the house; but, in either case, it should be applied with caution. When some of the plants nearest the glass may have been slightly touched with frost, the cultivator will remedy the evil by sprinkling or slightly syringing such plants with cold water as early in the morning as possible, after the cause has been ascertained; this will gradually thaw the leaves, and, if done before the sun or fire-heat begins to act upon them, will remedy the evil without endangering the loss even of the leaves.

VENTILATION.

Every fine day, at this time, particularly towards the end of the month, the ventilators should be freely opened, and also some of the sashes, to an extent in proportion to the warmth of the day; and the doors or sashes of the conservatory should also be opened in the same proportion. Every day air now becomes of greater importance to the plants, which, without it be given in abundance, would be drawn up sickly and weak.

WATERING.

This necessary element must now, to both compartments, be more freely administered; as many of the plants in both houses will be beginning to grow, and a deficiency of it would be attended with the most injurious consequences. Some plants, let it be remarked, will, however, still require it in moderation; but this can only be learnt by observation. All that can be

directed upon this subject can never be applied as a general rule, to which there are so many exceptions. However, we may infer that plants require water, not in exact proportion to the season, but to the state of growth in which they are individually, whether considered in the natural precocity of their growth, or their state of health. Those plants, for the most part, which are still in a dormant state, will require to be kept nearly as dry as they have hitherto been during the winter, and those which are in a sickly state may come under the same head; such, however, as are beginning to shoot forth should have it administered to them less sparingly, and those which are considerably advanced, or in full growth, should have it in abundance. Watering over the head should, in most cases, not yet be much indulged in; but if found necessary, from the situation of the house, or other causes, that is, if the foliage becomes dirty or much covered with dust, a slight use of the engine or syringe cannot be dispensed with; but this operation should be performed on a fine day, when an opportunity may occur of freely ventilating the house to dry up the superabundant moisture; and when such an operation appears to be necessary, it may be well to suspend watering at the roots for a few days previously.

SHIFTING AND REPOTTING GREEN-HOUSE PLANTS.

Many cultivators, who may be considered skilful in other respects, practise what they call a general shifting or repotting their green-house plants once, and many twice a-year. We have, however, in another part of this work, reprobated the idea of this mode of general shifting, as all plants do not grow equally fast, as well as that all plants do not vegetate at the same period. It would, therefore, be in unison with good culture, never to attempt such processes generally, but individually, for many plants only require to be repotted once a-year, some not so often, but by far the greater number, especially of young plants, will require this operation twice, thrice, or oftener, during the course of one season. It is, however, good practice to make a general survey of the collection at this time, and having picked out such as appear to be in want

of room, either for the purpose of attaining greater bulk, as is the case when large specimens are desirable, or what is more generally the case, as regards green-house plants, to give them additional strength, in order to enable them to produce a stronger bloom of flowers, as well as to keep them in general good health; then, having made the proper selection, they should be carried to the potting shed, and, as it is presumed that pots of different sizes are likely to be wanted, as well as that different sorts of mould be had in readiness, the operation may be proceeded in. In the first place, the mould should be dry, indeed it never can be too much so, at this season. In the second, the pots should be properly drained, that is, by placing one large piece of broken fragment of pot or oyster-shell over the hole in the bottom of the pot, with its concave side uppermost; over this a handful of smaller pot-shreds should be placed, according to the size of the pot, and over them a portion of rough turfy matter, broken into small pieces, the more fibrous the better. Formerly, when the practice of sifting the mould for these purposes was in vogue, the larger pieces which did not pass through the sieve in the process, were made use of for this purpose: but now, as that practice is justly exploded, as being injurious in the extreme, pieces of turfy matter are kept on purpose for this use. In the third place, the sizes of the pots should be chosen according to the size and natural habits of the plant. The careless and indolent may find an excuse in potting plants into too large pots, as it saves them the trouble of repeating the operation so often; but no part of the cultivation of plants, of whatever sort they be, is so bad as this. Some, however, may meet this accusation by remarking, that plants turned out of small pots into a conservatory border, or into the borders of a flower garden, succeed perfectly well: this we grant readily; but the cases are widely different, and those who have attempted to grow large and fine specimens of exotics, by planting them in very large pots at once, have been grievously mistaken in the result. Pots are graduated into equal divisions or sizes, from the smallest, which are called small thumbs, or thimble pots, about two inches diameter, to the largest, which are denominated *ones*, or number ones, and which are from fourteen inches diameter and upwards. What

those divisions, so exactly made, were originally intended for, or at what period of the pottery art they were adopted, is not very satisfactorily known; but it is of the less importance, seeing that this division into sizes is both useful and convenient, alike both to the potter and to the horticulturist. It may be laid down as a rule that, in the process of shifting plants, those that occupy the size called large sixties, should be shifted into those called small forty-eights, which is the next size larger, and so of the rest. It, however, sometimes, and indeed often happens, that a greater shift may with propriety be made, but this will depend entirely upon the state of the plant, its nature, health, and habits. Henderson, of Wood Hall, who, with Mr. M'Nab, the very intelligent curator of the Edinburgh Botanic Garden, have carried the culture of the genus *Erica* to a greater degree of perfection than any other cultivators, makes the following remark upon shifting plants, in the Caledonian Hort. Mem. "Never shift any plant till the pot be full of roots;" and, *en passant*, this holds good with all plants, "when the plants get large, several of them will continue in good health for three or four years without shifting, and flower well. I have," he says, "plants of *Erica retorta*," a rather delicate species, "in pots seven inches diameter, which are very bushy, being eighteen inches across, and fourteen inches high above the pot. *Erica infundibuliformis*, two and a half feet in diameter, and two feet nine inches high. *Erica pilosa* between five and six feet high, and three feet across, in pots eleven inches in diameter. These have not been shifted for five years, and are in high health, and covered with strong fine flowers, from the mouth of the pot to the top of the plant."

We may here also observe, that nothing looks so preposterous and bad as a mere twig stuck in the middle of a huge pot, which is sufficiently capacious for a plant ten times the size.

It is, however, only upon extraordinary occasions that a greater shift can take place at once, than that from large sixties to large forty-eights. Sickly or slow growing plants may be often benefited by being taken out of one size, and the ball reduced, the roots pruned and singled out, and repotted again into the same sized pot. *Ericas*, and similar feeble-rooted plants, seldom require a greater shift than from one size to that next

above it, while strong fleshy rooted plants, biennials and annuals, may require a shift of two sizes, but certainly not more at once. Much has been said upon composts and compounds in which to grow certain plants, and many of those which are proposed are as ridiculous as they are useless. All plants grow in soils prepared for them by nature, and are of the simplest description. It has been remarked by one of the best writers on this subject, that out of the three simple earths, viz. pure sand, heath, or what is more generally, although less correctly called by the name of bog-mould, and virgin loam, composts may be made suitable for any plant; aquatics, orchedious, and parisatic plants only excepted. From these three compounds, with the addition of vegetable mould, or rather the mould of decayed tree-leaves, and which, when perfectly decomposed, have been denominated by a late cultivator, if not the *primum mobile*, at least the *secundum mobile* of vegetation, can be made of suitable texture for any plant entering into green-house or conservatory collections to thrive in, provided all other parts of their culture be equally good. Dung, and every species of manure, are seldom used, and never when the end in view is to have neat small flowering plants; but sometimes, for individual purposes, and often in regard to stove plants and oranges; but, in either case, it cannot be even too much decomposed or ameliorated. As a general rule, but from which there are exceptions, we may state that most of the plants from New Holland, New Zealand, Van Dieman's Land, &c., including the heaths from the Cape of Good Hope, will succeed perfectly well in bog or heath mould, without any other mixture whatever; and they are also found to succeed equally well in a mixture of that mould, and virgin loam in equal proportions, or nearly so, or with the addition of a part of pure white sand, in proportion as it is wanting in the former, and according to the strength of the latter.

There are also light sandy moulds to be met with upon many heaths, and in many parts of the country, in which all of these plants will grow; of this kind of barren mould, that from Epping Forest, about Wanstead House, may serve as an example; it is this mould alone that has been used so successfully in the Clapton Nursery and elsewhere for some years. It is not the

colour but the texture that should be attended to in the selection; and that which retains just sufficient moisture, and no more, is to be preferred. When the water passes through the mould in the pots too rapidly, it may be considered too light, and to correct this fault, loamy earth should be added in proportion; upon the other hand, when the water does not pass through it, but remains long damp, and becomes sour at the roots, it is then too strong, and sand should be added until it be also corrected. Almost all plants will vegetate from seeds in vegetable mould, and many will continue for a long time to prosper in it afterwards, but by far the greater part like a soil of greater consistency, and one formed of light loam and heath-mould, with the addition of sand, may be considered the most general. Some few plants prefer pure virgin loam unmixed, provided it be light, and not approaching to clay; of this description we may instance that splendid, but much neglected, genus *Protea*. In preparing mould for potting plants, as observed above, it should never be sifted, for, by this unnecessary operation, all the fibrous rooty matter, which is true vegetable fibre, and the best food of plants, is rejected. Instead, therefore, of the sifting process, let the mould be chopped with a sharp spade, and well broken with the back of it, and it is then in fine condition for use. The vegetable fibre contained in such mould will supply an extra supply of food to the plants, while it remains open and capable of admitting the roots to ramble about without restraint; and by rendering the mass less solid, enables the superabundant moisture to pass freely through it; whereas, if sifted, the better part of the mould is thus kept back, and the whole mass soon becomes consolidated and incapable of admitting the water to pass through, which either retains it till the whole mass becomes sodden and sour, or, if perchance it be neglected in the watering, the ball becomes so hard and impenetrable, that the succeeding waterings cannot act upon it, and, as a consequence, the plant perishes at last for want of that necessary element. While the process of sifting the mould was obstinately persisted in, we recollect to have often seen hundreds of heaths weekly lost from this cause alone, for many consecutive weeks, in one of the first nurseries in the world; and, as a last remedy, we recollect having seen them

put into a pond by dozens, to become sufficiently moistened again.

When the whole intended to be shifted are finished, they should be staked up, if necessary, and well watered over head with a fine rose watering pot, both to clear them of the dust and filth that they may have accumulated during the process, as well as to settle the mould at their roots. They are then in fit condition again to occupy their places in the green-house.

PROPAGATING GREEN-HOUSE PLANTS.

Under this head it will be readily understood that we include those of the conservatory also, as all plants destined for the latter are propagated along with, and indeed are cultivated with the former, until their size either renders them unfit for remaining longer amongst them, or when of a proper size and age to be planted out permanently in the latter.

To enter into the detail of propagating green-house plants individually, would far exceed the limits prescribed to us, and, indeed, justice could only be done to such a subject in a separate volume. The cultivator who intends to propagate upon an extensive scale, cannot do better than consult the Exotic Gardener, by Cushing; or the Botanical Cultivator of Mr. Sweet, both excellent practical propagators and cultivators, and whose works on this subject are complete of their kind. The former is now becoming scarce, and would be a valuable work if revised up to the present time.

This is now a very favorable season for commencing the work of propagation, either as regards the mode of rearing from seeds, or propagating from cuttings, layers, or dividing the plant, and also for the more expeditious method of grafting, inarching, or budding.

For the propagation of plants, Mr. Sweet offers the following rational remarks: "A small house should be appropriated, a north-eastern aspect is preferable to any other, so as to have the morning sun, and none afterwards; they then want no artificial shading, for the less sun that cuttings have before they are rooted, and the more light, the better. A pit might be made in the house, and one part filled with fresh tan, another part filled

with rotten tan, and the third with mould." It is evident that this intelligent cultivator is here alluding to nursery cultivation, to which he was attached at the period of his writing on this subject; but we would suggest to private cultivators the mode adopted by us at this very time in the gardens of H. R. H. Prince Leopold, of Saxe Coburgh, which is the application of one or more common garden frames, according to the extent of the intended increase. But to return to Mr. Sweet's directions: "In the fresh tan might be plunged, under hand-glasses or bell-glasses, any cuttings of plants requiring heat; in the rotten tan, under bell-glasses, any kinds not requiring heat; and in the mould, under hand-glasses, large cuttings of green house plants, &c., which require no heat. Cuttings, particularly of woody plants, root best in fine sand, and are safer to pot off after being rooted, as the sand shakes clean from their roots without injuring them. When planted in mould, the roots are apt to break off in parting them; but some of the herbaceous or soft wooded kinds will not root well in sand, and must, therefore, be planted in mould. Cuttings must be put in when the wood is fit. Some kinds root freely in either young or ripened wood, other kinds will only strike in very young wood, and others only in ripened wood. From Christmas to April may be considered as good a time as any to put in most kinds of cuttings, as they root more freely before the weather gets too warm; but some kinds require to be put in every week throughout the year. No leaves should be taken off or shortened, except on the part that is buried in the ground, when the closer to the stem they are taken off the better. The more leaves a cutting has on it, the sooner it will root, though the majority of propagators trim up these cuttings like a parcel of naked sticks, which is the very reason of their not succeeding. The shallower cuttings are put in the pots the better they root, if they be but well fastened; if planted deep they are more likely to rot or damp off; the sand or mould in which they are planted must be kept moist, but not too wet, and the glasses must be wiped occasionally, for too much moisture on them will make the cuttings turn mouldy, and rot off, even after they are rooted. When the young plants are rooted, the sooner they are potted off the better, in as small pots as they can safely be got into;

for, if left too long in the cutting pots, the sand is apt to injure their roots. When they are first potted, they should be kept under a close glass for a few days, or in a frame on a gentle hot-bed, and shaded from the sun with a mat till they have taken fresh root, (this last is particularly applicable to cuttings of stove plants,) then harden them to the air by degrees. When the young plants are drawn up too slender, their tops should be pinched off, which will make them grow bushy. It is always best to top plants when young, if wanted to make them grow 'bushy;' if left to run up high, the knife must be used, which causes a wound that sometimes is unsightly. No leaves should be taken off the plants in this state, except decayed ones, for it weakens them very much. Taking off a large leaf from a young plant will generally kill it, a circumstance," as Mr. Sweet observes, "with which few cultivators are acquainted."

The majority of shrubby plants will increase by cuttings of the branches, although there be exceptions to this rule in some of the species of *Acacia*, and some others, when cuttings of the roots are made use of as substitutes; and some species of plants, which are generally easily propagated, such as *Pelergonium*, require the same means of propagation, of which *P. triste, gibbosum*, and some others, may serve as examples. Some numerous families, such as *Erica*, are, for the most part, propagated from cuttings of the young wood, and the remainder from seed. Upon the propagation of this delightful genus, that successful cultivator, Mr. Henderson, of Wood Hall, near Glasgow, offers the following remarks:—"The month of July is a good time for putting in most of those cuttings; but they must not be taken off till the young wood be firm. Cuttings of Ericas may be put in at any time when the wood is in a proper state." Many of them will be so by the latter end of this month, and sometimes some species are forwarded in a little heat, so as to enable their propagation to commence as early in the season as possible, that they may be fully established in pots before the commencement of winter. But to return to Mr. Henderson's mode of propagation: "Take the cuttings off the plants, about three-quarters of an inch long, *pulling* them off downwards, strip off the leaves nearly half the length of the cuttings; place the cutting on the nail of the thumb, and, with

a sharp knife at right angles, cut off the small end, close to the joint or place where it was pulled off the plant. Having done this, plant them into a pot filled with small pit or river sand, giving them a good watering to settle the sand about them. Set them on a shelf where they are a little shaded, cover them with glasses, and notice to keep the sand always moist. Some of them will be well rooted in three months, and others will require six months before they are fit to pot off." Mr. W. B. Page, of the Southampton Nurseries, an intelligent cultivator, and who was educated in the first school in Europe for the cultivation of this genus, observes: "A prejudice having spread that the culture of these plants is difficult, one of the greatest ornaments of the green-house has hence of late been neglected, although the method of culture be as easy and nearly as certain as that of the geranium, but requiring a little more delicacy in the execution." Indeed, the whole process of propagation by cuttings, requires a deal of nicety in the operation, as well as a constant care during the whole process; and though long practised upon such plants as the willow, the vine, and many others, which must have been pointed out to man by Nature soon after his creation, it was, however, so little known when applied to delicate exotics, that fifty years ago, even in this country, it was scarcely known but to a few of the most eminent gardeners. Upon the subject of propagation by cuttings, as it may be supposed to interest a great part of our readers, the following extracts from that valuable work, the Encyclopædia of Gardening, may be both interesting and useful:—"In respect to the choice of cuttings, those branches of trees and shrubs which are thrown out nearest the ground, and especially such as recline, or nearly so, on the earth's surface, have always the greatest tendency to produce roots. Even the branches of resinous trees, which are extremely difficult to propagate by cuttings, when reclining on the ground, if accidentally or otherwise covered with earth on any part, will there often throw out roots, and the extremity of the lateral shoot will assume the character of a main-stem, as may be sometimes seen in the larch, spruce, and silver fir. Cuttings then are to be chosen from the side-shoots of plants rather than from their summits or main-stems, and the strength and health of side-shoots being equal, those nearest the ground

should be preferred. The proper time for taking cuttings from the mother-plant is when the sap is in full motion, in order that, in returning by the bark, it may form a callous or protruding ring of granular substance between the bark and wood, whence the roots proceed. As this callous, or ring of spongy matter, is generally best formed in ripened wood, the cutting, when taken from the mother-plant, should contain a part of the former year, or in plants which grow twice a-year, of the wood of the former growth, or in the case of plants that are continually growing as most evergreen exotics, such wood as has begun to ripen or assume a brownish colour. This is the true principle of the choice of cuttings as to time; but there are many sorts of trees, as willow, elder, &c., the cuttings of which will grow almost at any season, and even if removed from the mother-plant in winter, when the sap is comparatively at rest. In these, and other trees, the principle of life seems so strong and so universally diffused over the vegetable, that very little care is requisite for their propagation. Cuttings from herbaceous plants are chiefly chosen from the low growths which do not indicate a tendency to blossom; but they will also succeed in many cases when taken from the flower-stems, and some rare sorts are so propagated." The leaves of some plants, especially such as are succulent, will form plants, such as *Bryophyllum*, *Hoya*, &c.; and the late Professor Thouin observes, that the same may be stated of certain flowers and fruits.

In the case of plants which do not readily protrude roots by cuttings, artificial means are sometimes made use of to induce this disposition in them; several curious notices have appeared in the Transactions of the Hort. Soc. upon this subject. Ringing the cutting, that is, if a piece of the bark in form of a ring be removed off the cutting previously to its separation from the mother plant, a callous will be formed, which will readily emit roots when taken off and planted in the ground; and it has been conjectured that a ligature would operate in a similar manner, though not so effectually, if made to encircle the shoot destined for a cutting, and should be taken off when an accumulation of sap has apparently been produced. In either case, the cutting should be amputated

below the circles, and the cutting should be planted so as to have the callous covered with mould.

The situation and position of cuttings, when placed in the pots, form no unimportant part of the process of propagating. By this means many kinds of cuttings will strike roots, when planted so close to the edge of the pot as to come completely in contact with it, that would not succeed if planted ever so carefully towards the middle of the pot; and others, when planted in the earth, will seldom, if ever, throw out any roots, but will most readily, if so planted that their base or lower end touch the bottom of the pot. This has been exemplified by a correspondent in the Hort. Soc. Transactions, in the case of eleven cuttings of oranges out of thirteen, which he rooted by this method, and afterwards by placing them in a moist heat. Some cuttings will root freely, when so placed, in a pot of sand, that either their sides touch the sides of the pot for their whole length, or their lower end come in contact with the broken potsherds or pebbles with which it is drained.

A friend of ours has succeeded in striking pots full of *Ericas* by selecting the bottom of a flower-pot, and so placing it within the pot for the cuttings, that the lower ends of all the cuttings touched the buried part of the pot, the cuttings being planted in pure sand.

PROPAGATING BY SEEDS.

This is the mode pointed out to us by Nature; but as many of our finest and rarest plants do not even flower with us, much less perfect their seeds, other methods have been had recourse to. When seeds can be ripened with us, or when they can be procured from abroad, it is the means of obtaining plants in the greatest numbers, and the only method of obtaining new or rare ones. On this head, Mr. Sweet observes:—

"Where seeds are received from abroad, some of them should be sown immediately, whatever season it may be; for sometimes seeds will grow when first received, which will not if kept some months longer: but the general time of sowing should be early in spring, that the plants may get strong before winter. A gentle hot-bed is best for bringing up most of the tropical kinds, but some few will come up better on a

shelf or on a flue of the hot-house. The sooner seedlings are potted off the better, as they do not miss their moving when potted off very young." Seeds from temperate climates, such as New-Holland, and similar countries, such as the Cape of Good Hope, &c., vegetate best in a cool temperature, rather moist than dry; for which purpose, houses with a northern exposure, or nearly so, are preferred. Most of these will vegetate freely in peat-earth, if finely sifted, and kept moderately moist and shaded, but the time of their vegetation is very uncertain; some appearing in the course of a fortnight or three weeks, others not in eighteen months, or even two years. Many experiments have been tried to hasten their vegetation, but none with very great success. Thick-shelled seeds, such as *Banksia*, &c., have been scraped nearly to the quick with a knife, and steeped in a chemical preparation with as little success. Steeping in milk and water may soften the shells of some seeds; and if it do them no good, cannot do them any possible injury. When seedling-plants appear above ground, they should be regularly and carefully watered with a fine rose watering-pot, but this operation should never be performed when the sun is shining on them.

PROPAGATION BY LAYERS.

This is a mode of propagation to which recourse is had in the case of such plants as do not freely strike root from cuttings, and it is best performed in spring, before the ascent of the sap; or, if not performed then, may be done with equal advantage when the sap is fully up, so that, as far as regards the plants under consideration, February and March, in the former case, and June and July in the latter, are considered the proper seasons. The processes of laying are various, and applicable to most shrubbery plants and trees. Greenhouse plants are generally layed either in the pot in which the plant grows, or more frequently in others that are filled with mould and brought close to it. In either case, the shoot intended to form the future plant is bent down, and a portion of it buried in the mould, in which position it is secured by means of a hooked peg. Sometimes the part of the branch

buried in the mould is slightly notched, split, twisted, or otherwise mutilated, and sometimes it is put under the mould without any cutting whatever. "If the cut or notch," says an author on this subject, "in the stem does not penetrate at least half way through, some sorts of plants will not form a nucleus the first season; on the other hand, if the notch be cut nearly through the shoot, a sufficiency of alburnum or soft wood is not left for the ascent of the sap, and the shoot dies. In delicate sorts it is not sufficient to cut a notch merely, because, in that case, the descending sap, instead of sending out granulated matter in the upper side of the wound, would descend by the entire side of the shoot; therefore, besides a notch formed by cutting out a portion of bark and wood, the notched side is slit up at least one inch, separating it by a bit of twig, a small splinter of stone or potsherd." Plants originated by layers, are not afterwards so likely to produce fine specimens as those originated by the other modes of propagation; but there are some which we are necessitated to produce in this way, because they are more difficult to propagate by any other.

PROPAGATING BY BUDDING, GRAFTING, AND INARCHING.

Many plants are propagated by one or other of these means; but as they have been already described in the *Fruit Garden*, any notice of them here may be deemed superfluous. We cannot, however, omit noticing a very ingenious mode of grafting, described by M. Oscar Leclerc, of the Jardin du Roi, Paris, in a communication to the editor of the Gardener's Magazine, and said to be the invention of Mr. Blaike, an eminent British gardener, who long resided in France, and who may be considered as the founder of modern gardening in that country: "This mode of grafting," observes M. Leclerc, "which I shall henceforth call the *Graffe Blaikie*, succeeds in most plants, both of the hot-house and open air; and it seems particularly well calculated for the propagation of intertropical plants and trees. The success which attends it on delicate hot-house plants, and particularly on those which are hard-wooded, is very difficult to be obtained by any other

means. During the time when the sap is in full activity, the scion must be procured, if possible, of exactly the same diameter as the stock on which it is to be grafted.

"First make two lateral oblique incisions, exactly similar, the one on the stock from above to below, the other on the scion from below to above, and both sloping from without towards the centre or interior of the wood. The tongues are then cut in form of a long wedge, by stripping them of their bark. The cut parts are then re-united, taking care, as usual, to make them coincide as exactly as possible. The scion being bound by ligatures to the stock in the ordinary way. The inferior part of the scion, that is, the lower, is plunged in a vessel of water. It will, however, be necessary to remove the water from time to time, and to renew the base of the submerged scion by cutting off its extremity.

"The stock is sometimes headed down immediately after the operation, in which case, particular care must be taken to leave a bud or a shoot above the incision, in order to attract the sap to the place where the operation was performed. Sometimes, however, the stock is not headed down till after its union with the scion is completed.

"When the plant operated on is small, and the scion of a delicate species, the plant should be covered with a bell-glass to prevent the too great transpiration of the leaves. The air in the interior must be occasionally renewed, as, without this attention, it would, by the evaporation of the water, be rendered too humid. If the diameter of the scion be less than than that of the stock, the operation must of course be different from the preceding. In such a case, the incisions must be limited simply to two longitudinal ones, of equal dimensions, one on the scion, the other on the stock. This is the easiest and the most natural mode, and also the most favorable for giving solidity to the graft."

This mode of grafting is, we think, particularly applicable to oranges, lemons, &c., and these plants, engrafted by any of the ordinary methods, that will admit of a portion of the scions being left long enough to be inserted into a phial or cup of water, will facilitate the operation. Some cultivators practise this mode of engrafting in this country; and a variety of

it may be noticed as practised by that intelligent and indefatigable botanist, Mr. Murray of Glasgow, who substitutes for the water a potato or turnip, into which he inserts the bottom end of the scion. Some propagators have recommended inserting the lower end of the scion into the mould of a pot, kept at a proper degree of heat and moisture; and in some cases where this has been practised, the scion has rooted into the mould, and where such has occurred, the part below the union of the graft has been cut off, and has consequently produced a perfect plant, giving thus two plants instead of one. Instances have also occurred of the scion rooting into the water, and in like manner producing a plant. It may be mentioned, as a necessary precaution in the above method of grafting, that to prevent too rapid evaporation, produced either by the sun or winds, a cap of stout paper or parchment has been recommended, which may be fixed a little below the part operated on, and so contrived as to enclose the whole of the upper part of the stock. This precaution becomes particularly necessary when the operation is performed in the open air, and particularly in the case of resinous or gummy trees.

Of the plants which belong to those departments, which are propagated by these methods, may be enumerated the families of *Camellia* and *Citrus*, the varieties of which are for the most part propagated by the two latter methods, as are some species of *Daphne*, *Berberis fasicularis*, and various others. Sometimes grafting is performed on the roots of some rare plants, as in the case of *Pœonia papaveracia*, which is often grafted on pieces of the roots of *Pœonia moutan*.

Experienced operators propagate plants by these means with much success, and indeed the idea of increasing the size of a *Camellia*, for example, to an almost unlimited extent, by inarching very large branches, or, in some cases, entire plants upon others of greater size, appears to us to be perfectly practicable. As the size of these plants adds to their value, and as they are several years before they acquire a large size, however well they may be cultivated, this mode of increasing them certainly deserves to be more generally adopted. No plant, that at present adorns our conservatories,

has greater claims on our attention than the one in question, and there are few who have seen the two splendid specimens of this plant, which were long and scientifically cultivated by Mr. Knight, the surviving one of which is now exhibiting in the Colosseum collection, and which has above thirty different varieties growing upon it, but who would be ambitious of possessing similar specimens. Large specimens of Camellias, and of several other plants, are more likely to be quickly attained by a process of this kind than by any other. The precise season of performing the above operations on exotic plants, will always be governed by the state of the wood on the plants, and by no stated period of the season. When the wood or buds are in a fit state, which has been described in the *Fruit Garden*, then the operation should be proceeded with.

PROPAGATING TENDER ANNUALS.

Tender annuals are plants of one year's duration only, as the name implies; and those termed tender, in contradistinction to hardy ones, are those which are natives of tropical or very warm climates. Much of what has been said on rearing annuals in the *Flower Garden* is applicable in the present instance; and the species which are most commonly cultivated, are balsams, cockscombs, globe and pyramidal amaranthuses, &c.; although many new and very interesting ones have been of late years introduced, and are in many cases, in a certain degree, substituted for them. The above, however, have long been popular flowers; and in every garden, where the convenience exists, a certain portion of them may be expected to be cultivated. The rule laid down for the culture of any one of this description of plants, may be said to apply very generally, with slight modifications.

The seeds, therefore, should be sown any time this month in pots, pans, or boxes, and should be placed in a cucumber or melon-frame, or in one put up on purpose, of an almost equal degree of temperature. The seeds should be sown moderately thick, and covered lightly. The mould should be both light and rich, as the end in view is to have large and

vigorous plants. When the seeds vegetate, water should be daily applied, as circumstances may require; and when of sufficient size, they should be potted off into small pots of light rich mould; the sooner they are potted off after coming through the ground, the better, as they will experience a less check than if left till of greater age or size. The leading feature in their whole management is to keep them growing rapidly; and as soon as their roots have nearly filled the pots into which they are first planted, they should be removed into those of greater size, and so on until they have attained their full size. If kept steadily growing, and abundantly supplied with water, they will not often show a disposition to flower until of a large size, which is particularly to be desired. But if stinted in pot room, or planted in too poor or light soil, or at any time checked for want of sufficient heat or water, they will come into flower prematurely, and consequently be small, and of much less value. Most of them, particularly balsams, thrive in good rotten dung, or, at most, with a small portion of rich loamy earth mixed with it. Some cultivators stimulate them by the application of liquid manure, obtained by steeping the dung of sheep or pigeons in a quantity of water, until it becomes highly impregnated with it. This application is of much importance to them, and is easily applied; however, care must be taken not to allow any of the liquid to come in contact with the stem or leaves of the plants.

Throughout their whole course of culture, the nearer that they are kept to the glass the better, as by that means they will become stocky and not drawn up, which they are very liable to do if not attended to, and in that case would never become fine plants.

APRIL.

TEMPERATURE.

Fire-heat may now be dispensed with in either of these departments, excepting on very particular occasions, such as drying up any excess of moisture, or occasionally about the beginning of the month to repel any sharp frost, which, though rarely happening at this season sufficiently intense to injure these plants, still, should it so happen, several degrees of less frost would be more injurious to them now, when they are just beginning to shoot forth, than at an earlier period of the season.

VENTILATION.

As the days become warmer, ventilation must be increased in proportion. A want of it at this period would be attended with very injurious effects. Every fine day, for several hours, the ventilators, when used, should not only be opened, but a number of the doors or lights opened still farther, in order to admit a sufficiency of this balm of life. Towards the afternoon, they should be shut up, and that should be done before the atmosphere of the house becomes too cold, as a genial degree of warmth from sun-heat is now necessary to encourage a disposition of growth in the plants.

WATERING.

Water should be more liberally supplied both to the plants in pots, and also to those planted out in the borders, than hitherto; and this must be applied less sparingly, accordingly as the weather is fine, and as the month draws to an end. In fine days, a gentle syringing will be extremely useful to the plants in both departments, to refresh their foliage and to clear them of dust or other filth; but this should only be

applied in the forenoon of very fine days, so that all dampness may evaporate before the houses are shut up for the night.

DESTROYING INSECTS.

Insects of various species and varieties will now be making their appearance, particularly on old stinted plants, and upon such collections generally where the plants are not in a thriving state. In a general way, insects, as we have already observed, are not the cause of diseases in plants, but the effects of it. Healthy and well-kept plants seldom are attacked by them, whereas sickly and ill-managed ones are sure to be infested by them. Some species are more liable to be annoyed by them than others, and Oranges and Camellias, in a particular degree, especially when stinted and ill grown. As the species which attack these are for the most part of the genus *Coccus*, the only effectual method of ridding them is by sponging them off with a brush or a piece of sponge with soap and water, going over the leaves individually. The *Aphis*, or green fly, frequently attacks the young shoots of the former; and in such cases, a safe, cheap, and efficacious remedy is to be found in fumigations of tobacco, or by anointing them with a strong decoction of that narcotic herb. That minute and destructive enemy, the red spider, will not appear, if fire-heat has not been too freely applied; but even then, a free use of the syringe or garden-engine will subdue them, or, what is more rapid in execution, although less agreeable in such structures, brushing the flues over, when heated for the purpose, with flour of sulphur, mixed in water, and applied with a large brush. As this latter remedy produces a very disagreeable smell in the house, ventilation must be freely indulged in for some days afterwards; and when more speedy means are necessary, sprinkling the floors and other parts of the house with odoriferous perfumes, or bringing in, in abundance, sweet-scented plants, such as *Mignionette, Neapolitan violets*, &c.

TENDER ANNUALS.

The plants of this description, originated from seeds sown last month, should throughout this be attended to, and

Drawn by J. T. Hart at Mr Mackays Nursery Clapton

ERICA MASONIA.

ERICA DEPRESSA.

ERICA PLURENETIANA.

ERICA CURVI
FLORA RUBRA

Published by Thomas Kelly, Paternoster Row March 1st

abundantly supplied with water, air, heat, and sufficient pot room, to obtain them in first-rate perfection. As a succession, seeds of all those sown last month should be again sown, and managed as therein directed.

As they will now be increasing in size, and the number necessary in an extensive place being considerable, a separate frame or frames should be appropriated for them, where they can be cultivated with greater advantage to themselves and less injury to other plants. It may be now also necessary to sow in considerable quantities seeds of all this denomination of plants, as many of them will succeed well, if planted out in the borders of the flower garden.

PROPAGATING PLANTS.

As the spring and autumn months are best calculated for this purpose, exertions should be made to forward the putting in of all cuttings intended to be propagated, as after next month the sun becomes too powerful for them to succeed well without a great deal of shading, which is not only troublesome, but never answers the end in view so effectually. However, as we have already observed, there are some that require to be put in every month of the year. Our observation above is applicable to a general process of propagating only.

PROPAGATING ERICAS.

This very interesting and numerous genus is best cultivated, as we have already observed, in a house dedicated exclusively for themselves; and where such is the case, such house is known by the appellation of heath-house or heathery, and to be complete should contain from two hundred and fifty to three hundred species, which will afford a considerable share of bloom throughout the year. Heaths are comparatively of late introduction; for we find that, in Miller's time, few were known, and those only of the hardy kinds: none of the Cape species being at that time introduced. To His late Majesty George the Third we are considerably indebted for the introduction of this charming genus of plants. That mo-

narch, at his private expence, sent Mr. Masson, a most assiduous collector, two voyages to Africa, for the almost express purpose, and by his exertions, the first collection of Ericas in this country was formed. The late venerable Mr. James Lee, in company with Mr. Kennedy, of the Hammersmith nursery, may be looked upon as the first professional characters who embarked in this speculation, and their collection was long looked upon as unrivalled in Europe. These were not only the first commercial collections formed, but there also the mode of culture first devised, which has been the means of disseminating them throughout Europe, chiefly under the management and direction of our late ingenious, although unfortunate friend, Cushing. Subsequent collectors have added considerably to this genus; and although last, not least, that indefatigable young botanist, Bowie, who not only visited Africa with a view to discover new species, but also to draw conclusions from their natural habits, to enable us to improve their culture; and from the observations made by him, and freely communicated to us as well as to others, there is no doubt, that had he survived his second journey, this genus, which hitherto has been considered rather difficult to propagate and cultivate, would have been much improved by his valued observations. A genus so interesting, and we may say, so long fashionable, must necessarily have attracted the attention of home cultivators; and from the profusion of flowers, which most of the species produce, and their parts of generation being for the most part so perfect, we need not be surprised at the many hybrides which the care or curiosity of the cultivator has produced. To the valuable exertions of the Hon. and Rev. W. Herbert, we are primarily indebted for many plants of this description; and from his paper upon this subject, in the Trans. of the Hort. Soc., we are led to infer, that this promiscuous impregnation goes on to a considerable extent at the Cape, where millions of them must be in flower at the same time.

Heaths, like most other plants, propagate themselves from seed, although most of those cultivated in this country have hitherto been originated from cuttings; few from layers, and, so far as we know, none have been propagated by grafting,

or similar processes. A considerable portion of them ripen their seeds with us, and there are annual importations of seeds from the Cape. Those seeds ripened in this country vegetate most readily; whilst those imported are often too old, or sometimes injured, before they reach us. As those imported generally reach us in winter, they should be sown early in spring; indeed, some cultivators advise their being sown immediately after their arrival; but we have hitherto found, that if sown too soon, that is, in February or the beginning of March, that they do not vegetate so quickly, and, in consequence, many of the seeds are rotted: for it is a maxim that should never be lost sight of in the culture of this tribe, which is, that artificial heat should be never employed, excepting in some cases of slow growing kinds, that may require a slight heat to draw the young shoots out to a sufficient length for the purpose of cutting; but even in this case, the seldomer that they are so excited, the better.

Artificial heat, therefore, is injurious to the process of originating heaths from seeds; we, therefore, in our own practice, as well as from observation of that of others, prefer the latter end of March or beginning of April for sowing these seeds; the natural warmth of the season then is sufficient to stimulate vegetation, and the young tender plants so originated have not the chance of being destroyed by damp cloudy weather, which we often experience in spring, and which would be of the utmost injury to them in their young state. Where extensive collections of plants are kept up, and in all large nurseries, there is generally a seed-house, that is, one expressly dedicated for the rearing of plants from seeds; such houses are generally low, having a northern aspect, as is the case in the Hammersmith and other nurseries.

Cultivators, who have but few seeds requiring such a structure, content themselves, therefore, with a good garden frame and glasses; and as such is portable, it can be placed where it is either shaded from the meridian sun, or great care taken in shading it artificially. The situation of such a frame should be both dry and airy, for damp would be extremely injurious to the young plants. Pots should be prepared for the seeds, of ordinary sizes, but those known as seed-pots are to be

preferred; they are broad and shallow, which admits of a considerable surface for the seed to be sown on, and of being rendered perfectly dry at bottom. Great care should be taken in draining them, for although the surface will require to be kept pretty moist, still no impediment must be left whereby the superabundant moisture would be prevented from passing freely off. The directions given for draining cutting-pots will be, if acted upon, sufficient for this purpose. The mould upon which the seeds of heaths are sown, should be of the sort called peat-earth, having naturally a considerable portion of fine white shining sand in it, or, if deficient in this material, it should be added to it by the cultivator.

As the seeds are very small, the mould for this purpose, to the thickness of an inch and a half, should be sifted very fine, and the surface of the mould in the pot rendered smooth and level with a small circular piece of board, say of three inches diameter, having a nail driven into the centre of its upper surface, by which the operator can use it to much greater advantage. Upon the surface so prepared, the seeds should be thinly sown regularly all over it, and covered with the same kind of mould to the thickness of one-eighth of an inch, more or less, according to the size of the seeds, as some are larger than others. The pots so sown should be then placed upon the platform in the seed-house, or upon a floor (if in frames) of finely-sifted coal-ashes, and after being gently watered with a very fine rose watering-pot, be shaded from the sun. This shading must be continued constantly on during sun-shine, until the plants be from half an inch to an inch high; afterwards it must be gradually removed to harden them by degrees, to fit them for potting off into separate pots. Some cultivators place bell or hand-glasses over the seed-pots when sown, and when such can be spared, they may be with some propriety used. For five or six weeks, the surface of the mould must never be allowed to become dry, but be daily examined, at the end of which time, the seeds may be expected to have vegetated. When such is the case, the bell or hand-glasses should be gradually removed, first by being lifted up about a quarter of an inch, and increasing this air, until entirely removed. Some seeds of course do not vegetate so soon as others, therefore

the pots should be still carefully attended to; but if after three months, or little more, all hope of their vegetating may be given up. Plants, so originated, will be about the middle or end of September in a fit state to plant out into thumb or thimble pots, as they are called, and which are the smallest sizes that are made.—(See *September*.)

Heaths which ripen their seeds in this country, should be sown as soon as they are ripe, provided this do not occur after the first of September; such as ripen afterwards (and several do so) had better be kept packed up in paper till the following April, when they may be sown as above directed. Plants originated at this time will be sufficiently strong by autumn to pot off; and it is even better then to pot off such as are very small, than allow them to stand in the seed-pots all winter. It is perhaps not easily accounted for, but plants stand the winter better when potted off in autumn in single pots, than if they were to remain in the seed or cutting-pots all winter; and the same rule holds good in regard to potting off cuttings propagated at any period of the year when quite young, that is, immediately after they have commenced making roots. This is not perhaps generally known, at least it is not always acted upon, as many persons, from an idea that the plants will become strong and better rooted, defer too long the process of potting off, and, in consequence, lose both time and many of their plants. It may, perhaps, not be quite out of place here to observe, that such seedlings or cuttings as have originated in the fine white sand of cultivators, should have their roots completely cleared of it before they are potted in their natural mould; for although most plants emit roots in that sand, it becomes injurious to many of them after they quit their cutting or seed state. Directions for propagating by cuttings have been already amply detailed, to render a recurrence to that process here unnecessary.

We may here however remark, that this family are less annoyed by insects than most other exotic plants, still they are not entirely exempt; for that destroying insect, the green fly of gardeners, sometimes attacks the heath, and as it is found impatient of the usual remedy, tobacco smoke, the best cultivators dip the plant, or parts infected, in a decoction of

tobacco liquor. Mildew sometimes attacks the heath; but this, like the cause of its appearance in all other cases, must be owing to damp or stagnation of air. To remedy this evil, has not always been found an easy task; indeed, we recollect, about two years ago, to have seen nearly the whole collection of this family in the nursery of a cultivator, who is allowed to be one of the best in the neighbourhood of London, nearly destroyed by it. Free ventilation and a dry atmosphere seem the basis of a certain cure, and the application of flour of sulphur dusted on the plants, or put on them in form of paste, may be considered as effectual in removing the evil.

CAMELLIA.

This very popular family, like that of *Erica*, *Pelergorium*, and *Orangeve*, has always the best effect when cultivated in a house by themselves; and as there are certain seasons in which this genus requires a treatment almost peculiar to itself, their separate culture is therefore the more necessary. The splendor and profusion of the blossoms of this genus do not only attract our notice, considered merely as an ornamental plant, but has a considerable claim on our more intimate regard, when we consider it as supplying us with one of the necessaries of life, and probably one of the most exhilarating and useful medicines of which our Pharmacopeias can boast. From the species *Camellia bohea*, *viridis*, and *sasanqua*, are obtained the well-known tea of commerce, which is imported by us from China, where these three species, together with *C. japonica*, grow in abundance, and in that country attain the character of evergreen shrubs or low trees. From these species have been originated, by cultivation, the many varieties, amounting to no less than twenty-eight, as enumerated in Sweet's *Hortus Britannicus*, besides many others, which have either appeared since the publication of that useful work, or been not altogether definitely settled at the time; one of the latter class, *Camellia japonica, var. Chandelarii*, we have chosen for our figure, named in honor of Mr. Chandelar, of the firm of Chandelar and Buckingham, successful cultivators of this genus, and who have originated a collection of varieties from seeds. The

CAMELLIA CHANDLERII.

Drawn by J. T. Hart, at Mr. Colvill's Kings Road.

London, Published by Thomas Kelly, Paternoster Row, Sept. 1, 1828.

most successful and generally adopted method of propagating this family, is by inarching or grafting; by either of these means each variety is perpetuated, but new varieties are only to be obtained from seeds; and as these seldom ripen, at least in any quantity, in this country, and few are imported in a fit state to vegetate, the propagation of new varieties is consequently a matter of some importance. As, in most other cases, it is from single flowering plants that seeds are to be expected, although sometimes the semi-double flowers also produce them, and of these, the common single red is the most prolific in affording seed. Sometimes seedlings so obtained are used only for stocks, whereon to work other rarer kinds, although sometimes they are kept till they attain a flowering state to ascertain their relative merits. Mr. Knight, of the Exotic Nursery, has shown us many seedling plants thus originated, which assume as yet different characters, so far as the buds, leaves, &c. are concerned, from those from which they have sprung; and, under the management of that very scientific cultivator, every justice may be expected to be done them. These we understand have been principally obtained from the magnificent specimen which he so long and so well cultivated, and to which we have already alluded. Stocks, however, are for the most part obtained by nurserymen from layers of the common single red, which they have often planted out in pits for this purpose, or from plants originated from cuttings of the same or equally common sorts. Camellias are sometimes budded, but for the most part are either grafted or inarched, and in either case, the process of tongueing is dispensed with, as weakening the stock; and that mode of grafting, termed *side-grafting*, is preferred. It may be observed, that, of all the stocks, for this or any other purpose, those obtained from seeds are the best; but, in regard to Camellias, as the seeds are two years in coming up, cultivators seldom wait till such stocks are of proper size to be operated on. Sometimes the double Camellias are obtained from cuttings, but this is both a tedious and precarious method of increasing them.

As to the proper season for grafting or inarching Camellias, the spring is the best, and just at that time when the plants have done flowering and are beginning to grow. This state

of vegetation does not always take place at precisely the same time, as some cultivators force their Camellias into bloom very early; such, therefore, should be operated upon not by the exact period of the year, but by the state of the plants. Some will be fit for this process in January, February, March, and April. Those, however, which are operated on in March and April, will have the better chance to succeed, although those which are operated on in February answer pretty well.

During the time the process is going on, the house should be kept rather closely shut up, and the atmosphere kept rather damp; however, these must not be too freely indulged in as in the former case, the plants would be liable to being drawn up weak, and consequently become straggling and of bad habits. The time that elapses before a union of the scion and stock completely takes place is various in different sorts, and more particularly in regard to the state of health and vigour in which the plants may be, as well as the favorableness or unfavorableness of the season. Observation alone can dictate when the clay and afterwards the bandage of matting should be removed. There is an evil in allowing either to remain on too long, as well as taking them off too soon; however, there is less danger to be apprehended from their remaining on a week or even two too long, than in taking them off a week too soon. Some cultivators adopt the *Graffe Blaikie* mode of inarching, as noticed in our article on orange-trees, with much success, and others also practise the mode recommended by Mr. Murray of Glasgow, by inserting the lower extremity of the scion into a potato or small turnip. Camellias will form a union when the branches are of considerable size; and, as we have already noticed, very large plants may be speedily formed by inarching several whole plants upon one common stock. This process is now becoming prevalent round London; and when the operation is properly performed, and the plant afterwards properly cultivated, specimens of large size may be expected to become more common than they have hitherto been; and certainly one or two large specimens of this plant, where there is convenience for keeping them, are better than a number of small ones, which take up the same room, and never can produce so imposing an effect as is the

case with large specimens. Upon one or two plants may thus be cultivated the whole collection of varieties and species now known. In grafting Camellias, much care should be taken to perform the operation neatly, so as to leave as little appearance of the place of union as possible. We recollect, when this plant was much less common than it now is, and the methods of propagating it less understood, that some cultivators, to hide this deformity in the stem, performed the operation very close to the surface of the pot in which the stock grew; and when the union had taken place completely, they used to repot them into deep pots, so as to bury the wound under the mould. A practice so unskilful was of course unsuccessful; the plants being thus too deeply potted did not prosper, and, as might be expected, deterred many from purchasing, from an idea that the plants were either short-lived, or would not grow without the care of a proficient person. The case, however, is otherwise: scarcely any plant is easier cultivated than the Camellia; although it must be admitted, that, to grow them in the first degree of excellence, much judgment is required. Camellias, like most other plants, have their periods of growth and also of rest; during the former state they cannot hardly be watered over much, and during the latter, they will soon languish if too bountifully supplied. For this, no rules can be laid down; experience and observation on the part of the cultivator alone can be a safe guide.

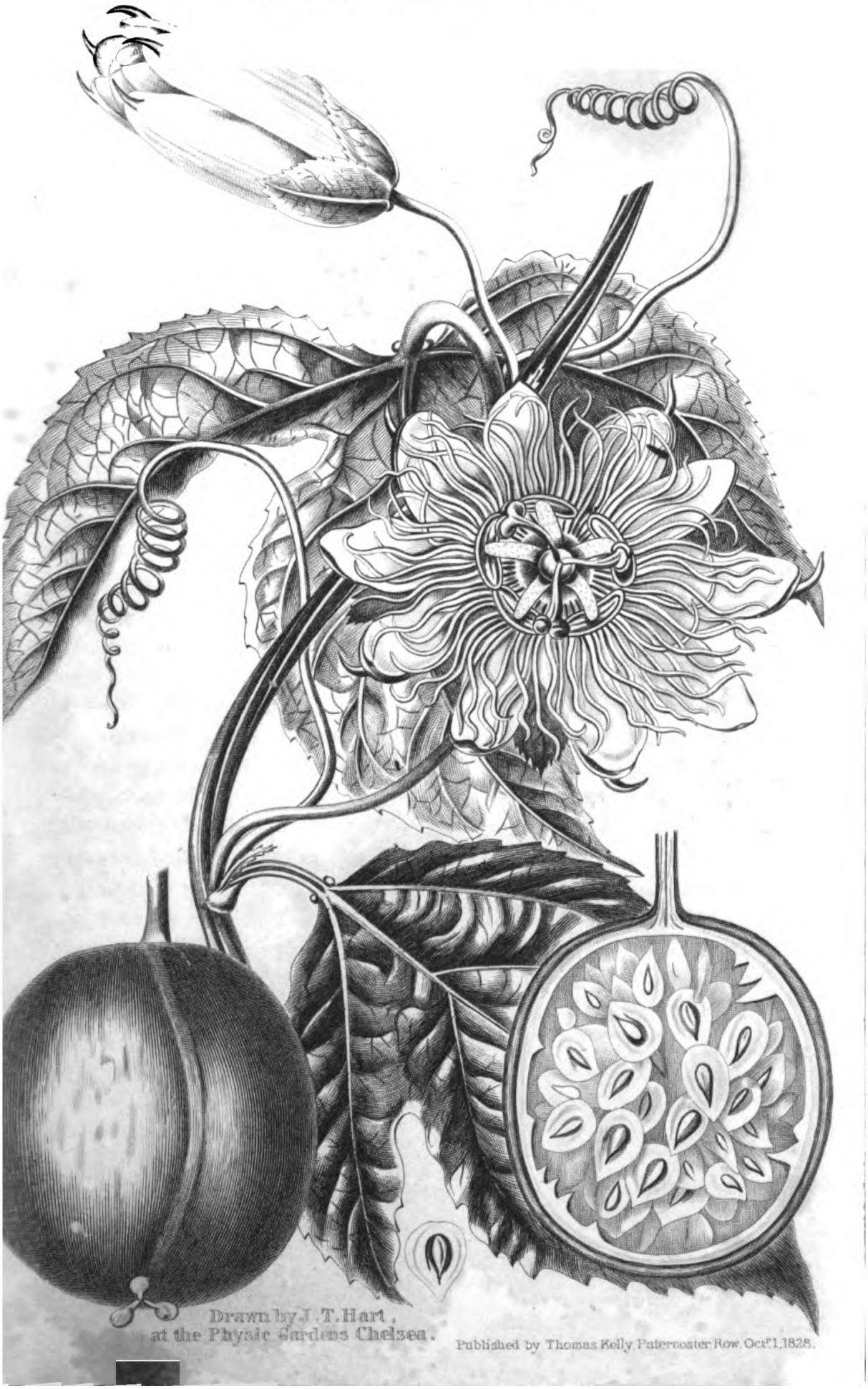
GENERAL CARE OF THE GREEN-HOUSE AND CONSERVATORY.

These departments should be kept perfectly clean, and in the highest order for neatness and regularity; a want of it in these departments can never be excused. The floors, stages, wood, and glass-work should be frequently and thoroughly washed, and even the pots should also be kept as clean as if new. All plants should be neatly and naturally tied up, as they may require it. However, no plant that stands erect should be tied up or supported if it does not really stand in need of it. Supporting a plant that can better do without it, is as preposterous as making a man walk on crutches who has the faculty of his legs perfect and complete.

This, however, is daily seen, and even in collections which ought to show a different example. Neither should plants be tied up in a stiff or formal manner, nor contorted into shapes which Nature has never designed. The natural character of all plants is the most pleasing, and those who wish to constrain them into other shapes, betray a great want of taste, and even littleness of mind. Neat sticks should only be made use of, and be so placed in the plant as to be as much concealed as possible. Short pieces of stout wire may be used with great advantage, as it combines strength, durability, and neatness; and bamboo or other canes, used for the same purpose, may be considered an improvement in this branch of exotic culture.

Plants of climbing or creeping habits, such as are employed in covering the opaque parts of green-houses or conservatories, and which are, when in good keeping, their greatest ornament, should be regularly and neatly tied or nailed up as they extend in growth, to prevent them from breaking, and more particularly from having an appearance of confusion and disorder. The different passifloras will be great ornaments to the conservatory at all seasons, as they produce their flowers in great abundance, and some of them even perfect their fruit: of these, *P. edulis*, of which our figure is a representation, is peculiarly handsome, and fruits in abundance, but requires the assistance of the cultivator in assisting its impregnation. The fruit is much esteemed in its native country, and it not unfrequently appears on the tables of the rich in this country. However, the flavour is such as not to be much admired by the majority of persons.

PASSIFLORA EDULIS.



Drawn by J. T. Hart, at the Physic Gardens Chelsea.

Published by Thomas Kelly Paternoster Row. Oct.1.1828.

MAY.

VENTILATION.

Air should be now abundantly admitted during the whole of every fine, and for a great part of every moderate day; shutting up the house, however, before the atmosphere is cooled too much by the chill of evening.

WATERING.

Watering should be applied now more freely than heretofore; and as some plants, while growing, require a very considerable portion of it, it will be advisable to examine the plants in the green-house every morning and afternoon. We presume that it is almost needless here to observe, that flats, pans, or saucers, should *not* be used under the pots; such a practice is so totally at variance with good culture, that none but the most obstinate or ignorant will use them. The plants in the borders of the conservatory will now be growing rapidly, and will require frequent supplies of water, both at their roots and also over their tops, which should be applied with the syringe or garden engine.

MANAGEMENT OF TENDER ANNUALS.

The plants of this description, originated from seeds sown the two former months, should be attended to both as to shifting into larger pots, as well as with water in abundance. (For further particulars, see *last month.*)

REMOVING THE PLANTS OUT OF THE GREEN-HOUSE.

Towards the end of this month, but not sooner, and then only if the weather be fine, and all likelihood of frost be past, many, if not the greater part of these plants, may be

removed into their summer quarters. This is a very old and reasonable practice. Experience, that safe guide, sufficiently proves the utility of the practice; and some plants which are even often inhabitants of our stoves during winter, are benefited by a free exposure to our climate for at least two months of the year. This practice is, however, less prevalent here than on the continent, particularly in some parts of Germany; but even with us it is becoming more general.

All those which are denominated Cape and New-Holland plants, with many of those from China and Japan, are usually turned out about this season, with the exception only of those which are in flower, from which it is desirable to obtain seeds, or when their flowers are either too delicate or rare to be trusted out; such as these are usually kept in the green-house until their seeds be ripe or their flowers faded. The situation in which they are placed when exposed to the sun, without the intervention of glass or other protection, is of much importance. A situation fully exposed to the sun is to be avoided, as well as such as are entirely shaded; and that which is under the drip of trees may be considered the worst of all. A spot moderately shaded by high walls, hedges, or buildings, is to be preferred; but where a display of picturesque taste is to be displayed, situations in the flower garden, shaded from the meridian sun, should be adopted. Here, if they be placed about in natural groups, harmonizing with the surrounding shrubs and plants, the effect will be imposing, and very different from the common practice of crowding them up in some obscure corner, as if hiding them out of sight. Plants, so turned out, should not be plunged in the borders, at least the more delicate and rare species; but as the covering of the pots would be desirable, they may be contrived to be hidden by covering them with moss, different species of *Hypnum*, &c. Two advantages naturally present themselves by this practice; first, the hiding of the pots, which can never well accord with flower garden scenery; and secondly, preventing evaporation from going on too rapidly, which all plants in pots are exposed to when not plunged, and when much exposed to the sun, as it proceeds rapidly not

only from the surface of the mould in the pots, but also from their outer surface all round.

A saving of watering would also be obtained, and the temperature, as well as humidity at their roots would be kept more regular, and of course in fitter condition for the roots to live in. During wet weather this covering might be removed, either partially or entirely, and replaced when more dry and warm. Damp situations will of course be unfit for either of these modes; but let it be also remembered, such situations are unfit for plants to stand in, even although placed on the surface. Coal-ashes or pebbly gravel would be good strata to plunge plants in, as in either there would be but little fear of their roots suffering from damp. Those who prefer the present practice of standing them on the surface, should prepare it for them by laying a floor of finely-sifted coal-ashes or gravel, smoothly rolled down, on which to stand the plants, as either will form a dry bottom for them, and, to a certain extent, prevent worms from getting into the pots; a circumstance to be carefully guarded against. Some collections are arranged upon wooden stages, as was formerly exemplified in the gardens at White Knights; but this practice is objectionable, inasmuch as the pots are far too much exposed to the action both of sun and wind, and the mould in them can seldom for any length of time be kept in any degree of uniform moistness; a circumstance of evident injury to the plants. Such as are tall, and likely to be blown down by winds, or other causes, should be supported as well as the nature of the case will admit; for this purpose, the London nurserymen run a system of cords in different directions, supported by neat rods, through their beds of green-house plants with very good effect; and when the plants are bushy and fine, the cords are not much seen. In arranging plants in pots, some little degree of taste should be displayed, but not of that cast so often met with, of arranging them in geometrical forms, which, like similar figures in flower garden clumps, have always a stiff and formal appearance. Irregular figures should be preferred, and an irregular outline of surface should also be attended to, and not that stiff shorn sameness of outline which has been the practice for above a century. Fine specimens should be placed in

conspicuous situations, which not only show off the character of the individual, but also aid in giving a more natural appearance to the whole. Very large specimens of exotic plants, such as *Agava*, *Acacia*, &c. will have a good effect, if placed out on the grass portions of the flower garden or on the lawn; but as the pots into which such are necessarily grown are large and would be unsightly, they should be sunk into places prepared previously for them, sufficiently large to receive the pot or tub, and which should be placed upon a brick or two to render their bottom perfectly dry. Such places may be constructed of brick-work, having a cover to be placed over them during the season, when no plants are in them, admitting of a little mould over the cover, upon which turf may be laid, to leave the lawn entire. Or, when a regular system of this kind is adopted, hardy evergreen plants in tubs, boxes, or pots, may occupy them when their more tender occupants are in their winter dwelling. Groves of *Camellias* and *Oranges* may be thus introduced in favorable situations upon the lawn or flower garden with good effect. But where fine specimens of these plants are required or admired, we cannot recommend their being so treated, except upon very particular occasions, and those of short duration. More hardy plants will answer this purpose without injury, whereas either of the two above mentioned can never for any length of time be trusted out with safety.

GENERAL MANAGEMENT OF THE GREEN-HOUSE AND CONSERVATORY.

As the plants are removed from the stages of the green-house, those tender annuals which have been forwarding in frames or other conveniences, should, as they attain their full size, or as they begin to come into flower, be brought in to replenish this department, as well as some of the less tender stove-plants, where such are kept. By the help of these, the green-house will not lose its interest for a single day, and the stove-plants will be much benefited by this free exposure to sun and air, as well as having more room than in their own department.

The tender annuals, particularly some of those latterly introduced, will make a fine show here till the season returns when the green-house plants must again occupy their own place. The conservatory may be kept gay now by the introduction of many of them into it, tastefully arranged through it amongst the other plants, and into such parts of it as were lately occupied by fine specimens of plants in ornamental pots or vases, and which will now be disposed of out of doors. When any of the flowers decay, they should be cut off, where the saving of seeds is no object; and those plants which become old or sickly, should be also removed, and replaced with others in greater perfection. Climbing plants should be attended to and regularly tied up, and all dead or decaying leaves picked off them, and the whole should be kept clean and neat, and all parts that will admit of it duly washed, or otherwise cleaned.

PROPAGATING GREEN-HOUSE AND CONSERVATORY PLANTS.

This is a very proper season for propagating most or all woody or shrubby plants, such as *Banksias*, *Dryandras*, *Metrosideros*, and similar plants, and in particular most of the genus *Erica*, as the young wood of all these species, and most of a similar description, will be in a fit state for the process. As the season is now sufficiently mild for such plants to stand out in the open air, it is also found that the process of propagation goes on much better out than in the house which has become much too warm for them. A sheltered and somewhat shaded situation should be made choice of, such as behind a wall or hedge, but not under the drip of trees. A bed of decayed tan, coal-ashes, or similar matter, should be prepared for the purpose, deep enough to admit the pots being plunged up to their brims; over this bed, so formed, should be placed a close frame and lights, under which the pots should be plunged as they are filled with cuttings. As the pots are plunged they should be covered with hand-glasses, in addition to the bell-glasses over each pot, particularly heaths and similar plants. Hardier or more free-striking cuttings need only be covered with the hand-glasses; and such as are evergreen and large

leaved, such as *Camellia*, *Laurus*, need not be covered at all, as they will strike root better when only covered with the lights of the frame. The frame being filled, or the required number of cuttings put in, the whole should be shaded with mats from the sun daily, and uncovered at sun-set, or nearly at that time.

A very great degree of attention is requisite to be paid them once or twice a-day, from this time until they have all struck root, to shade them properly, and to examine them frequently, to guard against damp, or other disasters, of which they are very impatient. The glasses should be every morning taken off and wiped with a clean cloth, and dried, if at all damp from the condensation of steam. Not only the smaller or bell-glasses require this care, but also the hand-glasses and even the lights of the frame. When any of the pots appear to be getting too damp, the glasses should be removed for a short period, until sufficiently dried. Water they will require only in a very limited quantity, but this must be supplied more freely as they began to make roots.

For plants propagated in May, or even June, this is a very reasonable way; and it often happens, that, from unforeseen circumstances, many will have to be deferred till this time, although, for general purposes, we would recommend the process of propagation to have been commenced much earlier, as already noticed. By adopting the above, an opportunity will present itself of again putting in cuttings, for such as may have failed, amongst those put in during the earlier spring months, and also of increasing such as may not till now have made young wood sufficiently strong for the purpose.

JUNE.

VENTILATION.

The doors, sashes, or other parts of the conservatory, that are capable of being opened, should now be kept open most of the day, except in the case of very cold or windy days, as the plants will require now all the fresh air that it is possible to admit to them. Conservatories that are for the most part portable now begin to show their character, and may be by the middle of the month removed.

The plants which now occupy the green-house, if the hints given last month have been acted on, will require to be ventilated according to the state of the weather. It is yet only on fine days that the sashes can be safely opened to any extent, or for any length of time, as the temporary inmates are impatient of much cold. But as the end of the month advances, it may be more freely indulged in, as they will have become hardier by that time, as well as that the season will have become more genial.

CARE OF GREEN-HOUSE PLANTS SET OUT LAST MONTH.

Watering must be attended to as the state of the weather demands it; during droughts, these plants will require much more water than they did while in the house, as evaporation goes on more rapidly. In time of wet or cloudy weather, they should be less liberally supplied with it, as the same process goes on more slowly. Any of the plants that may have been over-watered, or are become too wet from rain, bad draining, or other causes, should be turned over on their sides, or placed in exposed situations, until they become sufficiently dried up. They should then be examined by being turned out of the pots; and if imperfectly drained, should be repotted, and afterwards replaced in their former situation. Such as require to be supported, should be neatly tied up, and all dead leaves picked off. The surface of the pots should also be kept perfectly clean and free from weeds, and be occasionally stirred

up, which will give them a neater appearance, as well as contribute to the welfare of the plants. Any fine, rare, or curious plants which come into flower, should, if required, be removed into the conservatory, where they may remain till their bloom has faded.

The proper time for watering plants at this season, whether in the house or out in the open air, is the afternoon, as soon as the sun no longer shines upon them, and from that time till the evening. It will, however, often be necessary to water in the mornings also, and upon extraordinary occasions, even through the day. In watering while the sun is shining upon them, care must be taken that none of the water be spilt on the foliage, as it would scald their leaves, and render them very unsightly; and water applied to them during the hours of sun-shine is soon dried up, indeed before the plant has time to absorb enough for its sustenance. Gentle syringing in the evenings, during continued dry weather, will be of much service to them, by cleaning the foliage of dust, and refreshing them at the same time, and will also tend to cool the atmosphere round them, which at this season is of great advantage to them.

Succulent plants may be, when the collection is extensive, very advantageously placed out upon artificial rock-work, and in this way have a good effect; the reflection of the heat from the flints or stones will induce a disposition in them to produce their flowers in perfection. While out of the green-house they will require very little water, none indeed, except in dry weather, as the dews at night and the humidity of the atmosphere will be to them sufficient.

SETTING OUT PLANTS.

Such plants as were deemed too tender to be turned out last month from the green-house, may be by the middle of this month safely set out. Such as stand in need of shifting into larger pots, or otherwise renovated, should be attended to as they are taken out; and such as are in want of support should be neatly tied up, and otherwise treated, as directed for those set out last month.

JULY.

The directions given for this department for the last month, is, in every respect, applicable to this also. Any repetition here may therefore be considered unnecessary.

AUGUST.

GENERAL MANAGEMENT OF THE GREEN-HOUSE AND CONSERVATORY.

The directions given in the preceding months for the management of these houses, are in every respect applicable to this; and, under good management, both may be kept in a profusion of flowering plants, as the tender annuals and other substitutes will be now in the greatest perfection. To retain the flowers of most of these plants for the longest possible period, they should be abundantly supplied with water; and where convenient, without producing any disagreeable effect, shading them from the sun for a few hours daily will also considerably aid in lengthening the period of their flowering. Those which show a disposition to produce seeds, amongst the annuals, if not wanted for particular purposes, should have the seed-vessels taken off as they appear; for, however curious it may appear, annuals may be kept in a flourishing state for a considerable number of months, nay, many of them may be kept for several years by the simple process of keeping them from forming or perfecting seeds.

POTTING OR SHIFTING GREEN-HOUSE PLANTS.

We have already directed, at an early period of the season, the necessity of frequently shifting or repotting plants; few weeks will pass, where there are good collections kept up, but

this process will be required to some given extent. The plants being out at this time, their several states can be readily ascertained; and if all that require it be now shifted, they will be well established again in the pots before the winter season sets in. This operation is, it must be acknowledged, too generally put off till too late a period of the season, and, in consequence, the plants shifted have not time to make fresh roots to support them during winter, which is the real cause of a great loss in some collections, although it be seldom attributed to it. Many cultivators, however, and amongst them too some of the first London nurserymen, adopt a different plan, but one by no means to be recommended, and that is, to shift only at the times of putting out or taking in the plants, and this plan, they tell us, is to save trouble; but the reward of such a practice is, that many of the plants die, and many more are scorched up by the sun, having few or no roots to support them, and by the end of the season only begin to grow when they are about to be taken into the house; whereas, if otherwise treated, they would have quite a different appearance. By shifting early in the season, say the middle of March, the plants will have filled their pots with roots before they are taken out of the house, and will have made their wood and leaves sufficiently perfect, so as to be little affected by the sun and keener air to which they are exposed. By shifting at this season, as observed above, the plants will have filled their pots with roots before taken into the house, and so be better fitted to stand the winter. At this time they are also liable to send down roots, which, finding their way through the pots, extend themselves in the ground underneath them, and to the inexperienced eye appears to be rapidly improving, many of the robust growing kinds making very luxuriant shoots and leaves; but they would be far better without them, as when they have to be taken up in September or October to be placed in the house, their roots are necessarily broken off, and the plants thus experience a check, which they do not soon recover.

SEPTEMBER.

VENTILATION.

The evenings will now, particularly towards the end of the month, be beginning to become chilly and cold, ventilation must therefore be attended to, although during the day the plants should be as much exposed as possible; yet, during the night, particularly in wet weather, they must be shut up, at least all the roof-sashes must be closed. If the green-house be kept too much shut up at this time, many of the plants will, if not totally die, at least experience a very great check, and in consequence lose many of their leaves, and some of the more succulent or luxuriant shoots will damp off altogether. As they were gradually exposed to the action of air and sunshine in spring, so must they be gradually weaned from it at this season. In mild weather during the night, the ventilators, if any, should be kept open; and where there are not these conveniencies, the front or end sashes should be left partially open, so as to admit a pure current of air without admitting rain, which would be the case, were the roof-sashes to be opened.

The same rules are to be applied, in a certain extent, to the conservatory also; as the plants have, during the summer, been fully exposed to the air, they should now also be gradually accustomed to a less degree, accordingly as the cold weather approaches. It is only on very mild nights that much air can be admitted after this time; but during every day, until towards the end of the month at least, it should be admitted freely.

WATERING.

Plants in pots will for the most part require less water now than formerly; and those which are denominated succulents, may, with few exceptions, be considered as sufficiently supplied from the atmosphere. The plants in the conservatory should also have it in less quantity, as getting the borders into

a too damp state at this season would be disadvantageous to them. It will now be sufficient, if these plants be watered at this time individually, and not generally, as hitherto, and then only when the surface round their roots appears to be really dry.

REMOVING GREEN-HOUSE PLANTS INTO THE HOUSE.

Towards the middle of this month, many of the more delicate plants will require to be taken into the house, and towards the end, many that are of a hardier nature. This is a process in gardening, like many others, for which no precise rules can be laid down that can be of general application. The season, whether mild or cold, the situation in reference to the exact exposure or the latitude of the place, are all circumstances to be taken into consideration, and must always be left to the good sense of the cultivator. It is always better, however, to have them taken in too soon than left out too long. In the first case, they can be set thin, and abundantly ventilated; but in the latter case, if left out to be nipped by the frost, or the roots chilled with cold and wet, many of them will to a certainty perish, and all will be injured in a greater or less degree. As a general rule, all succulent plants should be taken in first, as being more liable to be soon injured by both frost and damp; next in order (we speak generally) the natural order *Geraniacæ*, and all similar soft-wooded plants. The hard-wooded plants of New Holland, and the *Ericas* from the Cape, may be the last to be removed to their winter abode. When the process of taking them in commences, the plants should be individually examined; all that require it, should be supported in a proper manner, and all superfluous or ill-placed branches taken off, as well as all dead leaves and twigs; the pots should be thoroughly cleaned, washed, if necessary, and the surface of the mould in the pots stirred up, if at all hard. When they are all thus prepared, they should be then carried into the green-house, and as yet set very thinly on the stages, so that they may not shade each other, nor impede the free circulation of air. For a few days after their removal into the house, they should be regularly looked over, and watered once, or if necessary,

twice a-day, as they will require more water at this period than at any other, and a want of it at this time would be of the most injurious consequences to them.

POTTING OFF SEEDLING HEATHS.

We referred the reader in April to the subject of potting off seedling heaths, which, if no accident have befallen them, will be now in a good state for being put into their second state of culture. According to the instructions then laid down, the smallest pots should be used; and being perfectly well drained, the mould should be prepared for them, of the same kind as recommended for the culture of this family. As the young plants will yet have made but few and small roots, the mould should be well prepared for them; and, independently of being well broken with a spade, should be put through a moderately fine sieve, but not so fine as that used for preparing the seed-pots. After this potting, sifting the mould should never be attempted, for reasons which have been already given.

In taking the young plants out of the seed-pots, great care is necessary, that they be not injured; each plant should be put into a separate pot, and when the whole seed-pot is thus potted off, the young plants should be carefully watered with a very fine rose watering-pot, and placed in the shade for a day or two. After which, they should be placed upon shelves in the heathery, as near to the glass as possible, that they may enjoy plenty of light and air. Here they should be shaded for a few days, if the sun be powerful, and gradually hardened to it, till at last they can bear it without flagging, that is, drooping their leaves, which, in the culture of this plant, should be carefully avoided. In this state they are to stand till spring, and to be regularly watered, and kept free of damp, which is their greatest enemy. In houses that are not in good repair, a careful examination must be made to remove such pots as are under drips from the roof, which, if not attended to, would soon destroy the plants. These minutiæ being attended to, they will require no farther notice till they are repotted in the ensuing spring, at the same time with the other plants.

OCTOBER.

WATERING AND VENTILATION.

The instructions which were given last month on the subject of ventilation and watering, are applicable to this month also, observing that both be administered with less profusion as the weather becomes colder. Thus far we may add, that the conservatory should be ventilated to its fullest extent only for a few hours in the finest days, carefully shutting up both sashes and ventilators every afternoon. With respect to green-house plants, they should be abundantly supplied with air on all favorable occasions; a deficiency of this element now would make most of them lose their leaves, and others damp off, sometimes the less hardy by the surface of the pots. They will require to be regularly looked over to supply them with water; but although the supply be daily, it should be given in a much less quantity than formerly. All dead leaves and branches that indicate a disposition to damp, should be removed; the surfaces of the pots kept clean, and as little water spilt unnecessarily in the house in damp days as possible. During this month the plants should be frequently turned about to the sun, and those which are delicate should be fully exposed, and not crowded under the shade of larger or hardier plants.

REMOVING THE REMAINDER OF THE GREEN-HOUSE PLANTS INTO THE HOUSE.

By the first or second week in this month, the remainder of the green-house plants which were not taken in last month, should now be taken in. The observations offered last month under this head, should be attended to. In addition, we may however add, that when there is an appearance of worms in the pots, the plants should be carefully turned out, without breaking the balls, and the worms picked out, which will be

readily done, as they are for the most part found round the outside of the ball. These troublesome creatures can, however, be expelled (as stated in the *Flower Garden*) by watering the mould in the pots with water into which unslacked lime has been put. The caustic property of the lime will bring them up to the surface, when they may be picked up and carried away.

All plants that are infested with insects, should be completely cleaned before they be taken into the house; but at this season, this will not often be the case if the plants have been properly managed during the summer, as their rapid and free growth will in most cases be a preventive. The scaly insects will, even on very healthy plants, particularly coriaceous-leaved ones, be met with, and they should be washed off with a sponge, or soft brush, and soap and water. Those plants which are sickly or ill-grown should be thrown away, if duplicates of them have been propagated; it is the height of folly to keep diseased or mis-shapen plants in any collection when they are so easily propagated. When a regular system of propagating is annually adopted, and all good cultivators follow that practice, a certain part of the stock will of necessity be to be disposed of, as in the end, no houses of reasonable dimensions would otherwise hold them; and as this is the case, all that are worn out, ill grown, or sickly, should be selected and destroyed. Almost all green-house plants flower and look best when young, and the cultivator who does not renew his plants to a considerable extent annually, will never gain much credit by his collection.

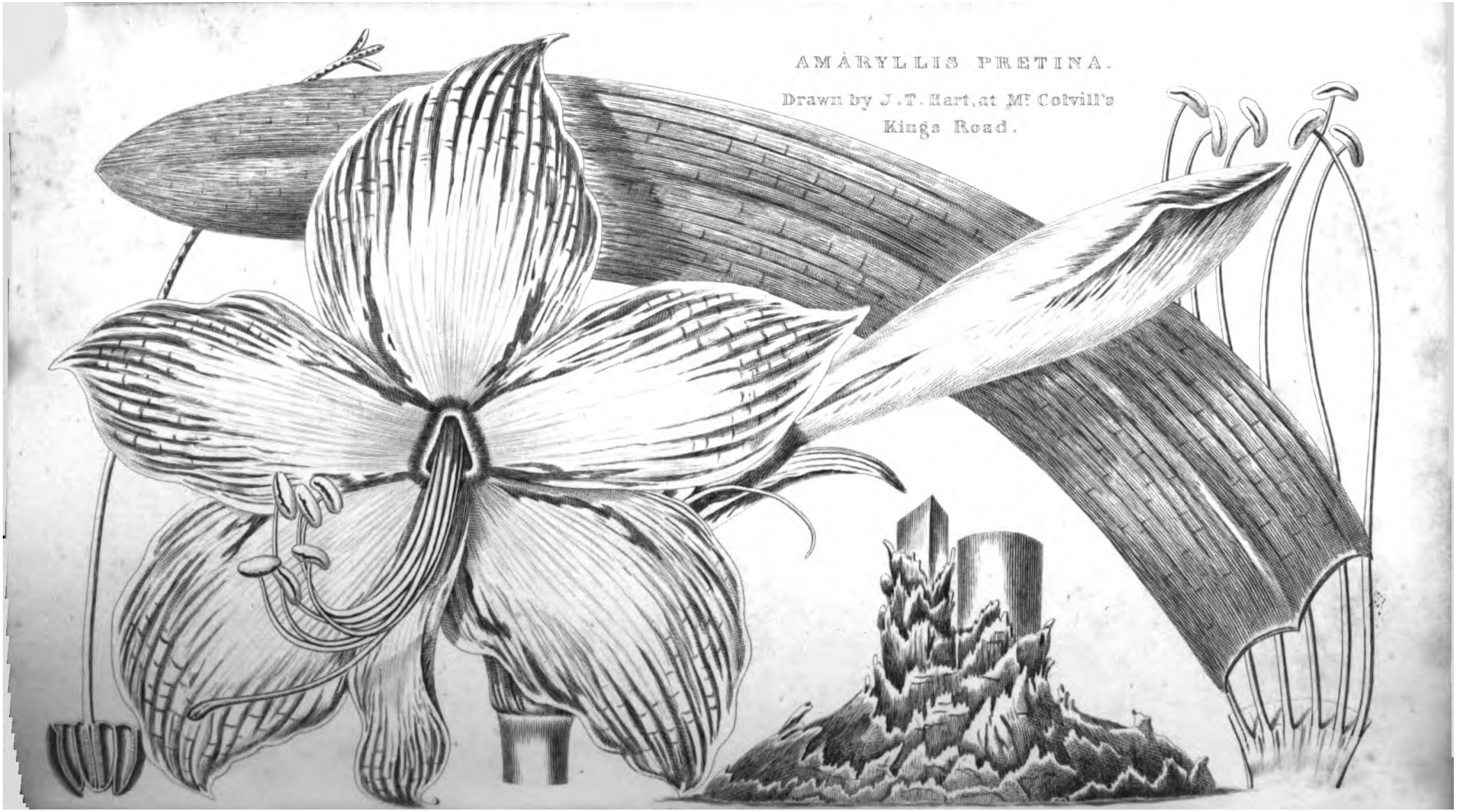
ARRANGING PLANTS IN GREEN-HOUSES.

The instructions which were given on the subject of arranging green-house plants, when set out in the early part of the summer, are to be applied here also; but as the whole collection is generally contained in one or two houses at most, a more general effect may be produced. As the season of the tender annuals, which has occupied the stages of the green-houses for the last three months, will be now past, they of

course are to be thrown away, and the whole space dedicated to the plants to which the house may be said to belong.

In arranging plants in houses, the first object in view with the cultivator is, and justly ought to be, assigning to each plant, or species of plants, situations or stations in it suitable to their respective natures, as some prefer the sun and some the shade. By far the greater part, however, prefer the former, and in any kind of arrangement they should occupy situations as much exposed to its influence as possible. Some families may be termed unsociable, that is, refusing to prosper when mixed with others different from themselves in some particulars, although often natives of the same latitude. Such has long been known to be the case with that numerous and delightful family *Erica*, or heaths; and hence probably the idea first originated of appropriating separate houses for them. Although it must be admitted that such an arrangement is to be preferred, it is not always that circumstances will admit of it; and in order that such a delightful genus of plants should not be discarded from collections on a small scale, we would recommend the idea of grouping them by themselves, either at one end of the green-house, if the number cultivated be considerable enough, or if only few in number, that they occupy a part of the front trellis or shelves nearest the glass, and always in the coldest end of the house. Almost all plants with small heath-like leaves succeed best when fully exposed to the sun and light; and as a rule, from which there can be few exceptions, all young plants, propagated during summer, should also be accommodated upon the shelves or trellises, either towards the front or ends of the house, so that they may be not only exposed to the light, but also under the more immediate eye of the cultivator.

That numerous division of plants, denominated succulent, and which contains many genera of green-house plants, can dispense with the genial rays of sun-shine for a greater length of time, without much inconvenience, than many others, if we except that interesting, although too generally neglected, division of plants, denominated *Ferns;* these may occupy back shelves: the former where there is no damp or likelihood of


AMARYLLIS PRETINA.
Drawn by J.T. Hart, at Mr Colvill's
Kings Road.

having water spilt upon them; the latter where they may be equally shaded, but in a more humid place. Thick leathery-leaved plants, such as oranges, and many others, will succeed in a tolerable degree of shade; and if large, may occupy the back parts of the green-house, where plants of more delicate constitutions would not prosper so well. Delicate-leaved plants in general like much light and sunshine, and therefore should occupy situations more in front; and the young stock of the present year's propagation should also occupy light and airy situations on shelves near the glass, and where they may be more readily got at, for the purpose of watering them, or performing any other necessary operations.

Green-house bulbous plants are peculiarly interesting, although by no means so universally cultivated in private collections as they merit. Those who have visited Mr. Colvil's splendid collection of these plants, can only form an idea of the beauty of them; and if it were generally known that their culture is so simple, few, we believe, would hesitate to add them to their collections. As to their situation in the green-house, it is only while in flower that they intrude themselves upon us, as requiring any room or even much attention; and then they amply repay us for any care or attention that they may for a time require, by the splendor and diversification of their rich and elegant bloom. The accompanying figure of the *Amaryllis psittacina* was drawn from a plant in flower in that splendid collection at a time when upwards of five hundred others were in bloom. During a part of the year, they, like most other bulbs, become dormant; and while in that state they may be taken out of the pots altogether, and the mould shaken from their roots and kept in boxes well ventilated, in a temperature rather above that marked temperate on Fahrenheit's scale. In this state they may remain until they be showing flower, when, as they appear in that state, they should be potted, and introduced into the green-house; and when done flowering, and the leaves fully formed, and beginning to decay, they may then be again removed.

COLD PIT DEPARTMENT.

Amongst nurserymen, and in extensive botanical gardens, these structures are very common, and are found to be very useful appendages for wintering many half-hardy and often many green-house plants. These should now be refreshed with fresh coal-ashes, gravel, or other similar material, upon their bottoms or floors, upon which the plants are to be placed. A very considerable portion of the Cape heaths, and not a few of the New-Holland plants may be placed in them, which, with a little care in covering up, and regular management, will survive the winter better than plants in an ill-kept green-house.

And in such pits may with propriety be kept all or most of the delicate varieties of China roses, of which the yellow China, as our figure represents, is amongst the most interesting; and the sweet-scented China, which is too delicate to prosper well in most situations, could be brought to the greatest perfection if kept in pits of this kind during the winter months.

To those whose circumstances do not admit of having green-houses, commodious accommodation could be easily and at little expense obtained by the use of pits, which, if kept water-tight, and the frost excluded, which can always be done by covering sufficiently, tolerable collections of exotic plants might then be expected to be met with, not only in our suburban gardens, but in the gardens of every private individual throughout the kingdom, whose taste or fancy might lead him to their cultivation.

YELLOW CHINA ROSE.

Drawn by J. T. Hart,
at the Garden of Mr Stark, Thistle Grove,
Little Chelsea.

Published by Thomas Kelly, Paternoster Row, May 1 1829.

NOVEMBER.

VENTILATION AND WATERING.

Abundance of fresh air should be daily admitted to the plants in the green-house when the weather is not too frosty and cold, for much of the success of getting them well through the approaching winter depends upon a regular attention to this hint. The conservatory also demands particular attention, as far as regards this process, both to keep the plants in a healthy growing state, and to preserve them from damping. Should damp at any time gain a-head in either department, a slight fire may be made on a fine day; and when the flues begin to become warm, the ventilators, and even part of the sashes, should be opened, to permit the steam which is generated to pass freely off.

Plants in pots will require to be daily examined, that none become too dry; however, the quantity of water given must be limited, as it is now better that the plants appear to be dry than otherwise. In watering, as little should be spilt on the leaves or other parts of the plants, and also on the floor of the house, as possible, as that is certain to produce damps, which at this early part of the winter are very detrimental to them, much more so than towards the spring. The watering should be always henceforth performed as early in the day as possible, that the sun may dry up the superfluous moisture before the house be shut up for the night.

TEMPERATURE.

It is seldom that fire-heat is required in either of these departments till towards the middle of the month; however, the cultivator must be on his guard now every night, for there is little dependance to be placed on the weather after this time. A slight degree of frost now before the plants have done growing, will do more mischief than a greater degree of it at a more advanced period.

POTTING BULBS FOR FORCING.

Either the latter end of last month, or the beginning of this, is a good time to pot bulbous roots for forcing, to decorate the drawing-room, the green-house, or the conservatory, early in spring, before other plants come into flower. The kinds most generally in use for this purpose, are hyacinths, jonquils, Persian Iris, narcissus, tulips, and crocuses; and, in addition to these, when the taste of the cultivator leads him that way, may be added most of the bulbs indigenous to the Cape, such as amaryllis, oxalis, isia, gladiolus, &c. Either of these may now be potted, in pots of sizes differing according to the size of the bulbs; although these plants, particularly the larger growing kinds, will produce their flowers in much greater perfection when potted singly, yet it is very usual to plant more than one, nay often many roots into one pot, particularly of the smaller-sized kinds. The mould most proper for them is like that recommended for all other bulbs, light and rich; indeed, it cannot be said to partake too much of either of these properties. Still it must be borne in mind, that unprepared dung, that is, such as has not undergone complete decomposition, should never be used. A compound of fresh maiden yellow loam, pure sand, and completely rotten dung, at least twelve or eighteen months old, is to be preferred, and a smaller portion of vegetable mould of decayed trees or leaves may be advantageously added. The proportions of each must be regulated by the kinds of bulbs and by the texture of the loam, whether strong or friable; if strong, a greater proportion of each of the other parts must be added, particularly that of sand, but if friable and light, a less quantity of either will suffice, particularly of sand, which in all cases is added to reduce stronger soils to a proper texture. In planting the bulbs, they should not be put in too deep, but a part of their upper surface or crown should be left uncovered. When the whole are planted, they should be buried under some rotten tan, saw-dust, or dry light mould, in a dry situation. We allude here to the hardier kinds, such as are in most common cultivation. In this situation they are to remain until taken up to be placed in the green-house or forcing-pit,

which latter situation is the most proper, although less common. Those denominated Cape bulbs are, however, not treated in this manner, but there can be no doubt that, to a certain extent, a similar treatment would be beneficial; for, being excluded from the action of air, a disposition is naturally brought on to push out roots; and these being once produced in abundance, there can be little doubt that the bloom will be proportionably stronger. At present, cultivators content themselves by merely placing them upon shelves or other convenient parts of the green-house, and some few, with greater propriety, place them in cold pits, where they are defended both from too much wet and frost; here they remain until coming into flower, when the pots are cleaned and the plants carried into the green-house or conservatory.

GENERAL MANAGEMENT OF THE GREEN-HOUSE AND CONSERVATORY.

All the dangers of winter have now to be guarded against, such as excess of dampness, coldness, and stagnation of air; all of which require a daily examination. Dampness is to be expelled or prevented by a proper attention to the temperature and ventilation of the house. In watering now, care should be taken not to spill any on the leaves or floor of the house, particularly in damp or rainy weather; and also that no plant be too much supplied with it, particularly if in a sickly or weak state. Watering over head should only be resorted to upon extraordinary occasions, in the country, where the air is pure, but in and round large cities, and in confined atmospheres, it cannot be well dispensed with. Therefore, when that process is applied, a clear dry day should be chosen, and ventilation freely attended to; should this not dry up the superabundant moisture completely, then the assistance of the furnace and flues must be called in to give their aid. All green-house plants should be regularly gone over, and all dead leaves picked off; the surface of the mould in the pots cleaned or stirred up. Such plants as require it should be supported in a neat and natural manner, and often turned round, so that all their sides may derive an equal benefit from

the sun. This last simple process is too little attended to; hence the many deformed and mis-shapen plants for which most green-houses are so very conspicuous. Cultivators often, for want of attending to this, allow many plants to become one-sided, as it is practically termed, that is, having one side only fit to be seen, and the other, which has been shaded for some months, unfit for being exposed to sight. This once being the case, they go on increasing in deformity, until at last they become either a disgrace to any ordinary collection, or die altogether. This would never be the case if attention were paid to this point, occasionally turning them round, allowing every side of the plant to enjoy a share of sun-shine, particularly during the dark months of winter. The plants in the conservatory should be also regularly attended to, all dead leaves should be picked off, and all decaying parts of flowers. The surface of the borders should be frequently stirred up, and attention paid to tying up and supporting such plants as require it. The climbing or creeping plants should be somewhat pruned in, that is, all straggling and ill-placed shoots either removed or shortened, both that the shade which they create may not injure those under them, as well as to make room for a supply of young wood for the flowers of next season. All annual or temporary plants, which may have been introduced for their flowers during summer, should now be taken out, that the house may not be crowded with plants not its own, and that room may be made for such as belong exclusively to that department.

DECEMBER.

GENERAL MANAGEMENT OF THE GREEN-HOUSE AND CONSERVATORY.

This is the most gloomy month in the year. All the vegetable part of Nature is, as it were, in a state of rest or sleep. Vegetables, if it may be so expressed, require a season of rest to fit them for their various and important duties, and during this season of inactivity, the roots are acquiring fresh strength, that they may, when excited by proper stimuli, perform their various functions in perfection and with vigour. Some plants may, however, be kept in a growing state during the whole of their lives; but this is only the case with such as are of very limited duration, such as annuals, some biennials, and some perennials: the two latter when artificially excited or stimulated. Some plants naturally require a long secession from the offices of life, and remain dormant many months, some more than one year; and circumstances sometimes occur of the roots of plants, when disturbed, continuing inactive for many years. The seeds of many plants, also, retain their vegetative properties although buried in the earth for half a century.

In regard to the plants which occupy the green-house and conservatory, most of them at this season will be almost inactive, they therefore require little stimulus, particularly that of heat and water; the less of either of them that is applied, during this month, the better we have always found the plants to push forth in the spring. Some few, indeed, are even during this month naturally in flower, but these can only be considered as not sufficiently weaned from their native habits; and some others will produce their flowers now that have from some cause, either intentionally or accidentally, met with a check, or been altered in their economy during the preceding summer or autumn. It may not be unworthy of notice here, as we believe the circumstance is not generally known, at least we have never heard it advanced, nor have we met with any ac-

count of it in any horticultural work that has come under our observation; viz. that several rare plants that do not perfect their seeds with us from the flowers produced in summer, do so from flowers produced during the winter. It is not here the place, probably, to endeavour to account philosophically for such a cause, which would require more room in the elucidation than we can spare, in a work professedly plain and practical, but that such is the fact we have more than once had an opportunity of witnessing. This is the case with such plants in particular as abound with that honey-like matter, poetically called nectar, from its being the fancied drink of the gods. A too abundant supply of this liquid, which is supposed the primitive food of seeds, may probably be the cause of the sterility of those plants, which abound with it during summer, when it is naturally more abundant in them. During autumn and winter it is in much less quantity in flowers, and in this manner may be just sufficient, and no more, for that important office for which Nature has designed it.

The green-house and conservatory will now be the favorite lounge of the proprietor who indulges in the beauties of Flora, they should therefore be kept in the greatest possible order and neatness. Should insects appear upon the stems or leaves of the plants, they should be suppressed by some of the numerous rules laid down in various parts of this work, or by means probably more economical, convenient, and complete, which the cultivator may either devise or adopt.

AN ENUMERATION

OF THE PRINCIPAL GENERA OF

GREEN-HOUSE AND CONSERVATORY PLANTS;

WITH THE SOIL EACH GENUS THRIVES IN.

INCLUDING THE MODE OF PROPAGATION, WHETHER FROM SEEDS, ROOTS, CUTTINGS, &c. &c.

Previously to entering upon the enumeration of the genera, the following observations may not be deemed irrelevant:—

Peat, loam, and sand, are the three simples of nature which are made use of by cultivators, and the composts which are formed of them in different proportions may be said to suit all plants; those that are parasitic, of course, being excepted. To these are added occassionally vegetable mould of decayed tree leaves, and in some cases dung, which has long undergone the process of fermentation, and become perfectly decomposed. Lime-rubbish, pounded brick-bats, and gravel, are used in the cultivation of some succulent plants, which require for the most part little nourishment from the soil, and chiefly exist on the humidity of the atmosphere.

Peat, properly so called, is decomposed vegetable matter, composed of, in some cases, entirely of decayed *Sphagnum*, and other mosses; in others, of decayed wood, mixed with herbaceous remains, and most generally of an heterogeneous accumulation of many vegetables. This sort of peat is not so much used, nor is it so much prized by cultivators, although for some plants it is very useful.

Sandy peat, in its natural state, is most esteemed, and is to be found on the surface of most heaths, and is composed of decayed vegetable matter, of a black colour, and pure white shining sand, in considerable abundance.

Sandy peat may be formed by adding pure white sand to the peat of entire vegetable remains, which is entirely without

sand naturally; and as a substitute, vegetable-mould of decayed tree-leaves and sand may be used.

Bog-mould is generally confounded with the above kinds of peat, but is more correctly used when we express any thing relating to peat of vegetable remains, or such as is used for fuel; but even in such mould many plants flourish.

Loam is of various kinds, differing in colour, texture, &c.; but that which is used by cultivators simply is of two sorts, namely, strong loam and light loam. The former is less used than the latter, and nearly approaches to clay, being of a yellow colour, and feeling greasy to the touch, but breaking freely into pieces when half dried. Such loam as becomes hard when dried, is not so useful to the cultivator, but it may be partially corrected by the addition of sharp sand.

Light loam is generally to be preferred, and that which is obtained from the surface of sheep walks or downs, which have never been under cultivation, is the best, and is denominated virgin-loam. Its colour is in general yellow or hazel-colored, although sometimes black. Such loam contains only a small portion of sand, which may be detected by washing and examining the sediment. It generally contains a considerable portion of fibrous matter, and the greater quantity that it does contain, the better. It is seldom good for immediate use, if taken deeper than six or ten inches below the surface, although some instances occur when it has been found good at a greater depth. It, however, should be dug up, and exposed to the action of the atmosphere some time previously to its being used.

In the following short directions for the propagation of green-house and conservatory plants, notice is repeatedly taken of the following composts. These are in general compounded in nearly the following proportions:—

Sandy Loam.—Three-parts loam to one of sand.

Sandy Peat.—Often found naturally upon the surface of heaths, and contains a large portion of pure white shining sand. When artificially compounded, three-parts of peat to one of pure sand.

Rich Sandy Loam.—One-third or fourth very rotten dung added to sandy loam.

Rich Sandy Soil.—Same as above.

Sandy Loam and Peat.—Half sandy loam and half peat.

Loam and Peat.—Half light loam and half peat.

Peat and Loam.—Same as above. When loam precedes the word peat it is understood that the genus will prosper in a greater proportion of it, and *vice versa*.

Loam and Peat and Rotten Wood.—Half loam, half peat, and a small portion of rotten chips of wood added.

Loam and Rotten Dung.—Three parts loam, and one of rotten dung.

Rich Loamy Soil.—Either pure rich maiden loam, or loam enriched with dung, vegetable-mould, &c.

Loam and Lime-Rubbish.—Maiden loam and lime-rubbish mixed.

Very rich Light Mould.—Chiefly decayed dung and vegetable-mould.

In regard to propagating by cuttings, fine white sand is generally used, into which the cutting is inserted; below which, after the pot is sufficiently drained, that sort of soil is placed in which the genus is found to thrive. There are few plants that are capable of reproduction by this means, that will root freely in sand; and many of the freely-growing sorts will strike in the mould recommended for the genus.

The shallower that all cuttings are put in the pots, the sooner and better they will root. The sand must never be allowed to become too dry, for in such a case much injury might be done before the cultivator might observe it. Neither should they be kept too moist, for fear of damp, which should be guarded against by frequent observation, and by once or twice a-day wiping the glasses with which they are covered. The sooner that cuttings are potted off, after they are rooted, the better; and if carefully shaded, and not put into too large pots, the better they will thrive. The sand should be completely removed from the roots of the cuttings previously to potting off, for it is very injurious to most plants, particularly those that are of delicate growth. This circumstance does not appear to be generally known, at least if it be, it is not always acted upon, and to this may be attributed many of the failures which usually attend the potting off of cuttings.

Plants originated from cuttings taken from plants in a flowering state, have an advantage over seedling-plants, as they come into bloom much sooner, and often while quite small; thus geraniums, and many other plants, propagated from the terminal shoots that would produce flowers, are found to root and come into bloom when only a few inches high, and often in pots of not more than three inches diameter. Seedling-plants, although they in general grow much more luxuriantly, seldom produce their flowers till they have attained nearly their full size. Plants originated by laying, also bloom soon, but can seldom be trained, excepting in the case of creeping or climbing-plants, to any thing like a handsome head. But laying is the only means by which some plants can be propagated with facility, and hence it becomes necessary.

Plants originated by budding, grafting, or inarching, come into bloom soon after the operation is completed; but unless the operation be performed with judgment, the part of union long remains a blemish. In regard to budding or inarching those species which are difficult to be otherwise propagated, it should be borne in mind, that almost all plants capable of being increased by this means, will take upon one or other of its own family that may either be more plentiful or less valuable; and some plants will take upon others not directly belonging to their own genus, but nearly related to it in natural affinity.

The modes of propagation pointed out to us by Nature, are seven: first, universally by seeds; secondly, partially by offsets, slips, germes, runners, suckers, and bulbs, and by these means all plants are naturally multiplied. But so many circumstances combine, in the culture of many species, that renders it impossible for the best cultivators to increase their stock by these means. Artificial methods have, therefore, been invented, and these may be enumerated under five heads, namely, cuttings, budding, grafting, of which there are many varieties, (see *Fruit Garden*,) inarching, and laying. By some of these means, almost all plants cultivated in our gardens may be increased or perpetuated.

In propagating by natural means, we may observe, that, as seeds are the first, and by far the most general of all the na-

tural modes of propagation, great care should be taken by the cultivator to save such as ripen in his own collection. When the object is to perpetuate the same species or variety pure and unadulterated, which is often the case, particularly with the florist, every precaution should be taken to prevent them being impregnated with the fertilizing dust of any other species to which it may be allied; but when the object is to increase the number of varieties, a considerable degree of judgment is required on the part of the cultivator; first, that choice be made of two flowers, each partaking of certain properties, which, if combined in one, would make a hybrid, possessing the wished-for merits. In such cases, nothing should be left to chance: the male parts of the one may be carefully cut out with a pair of very sharp-pointed scissars just before the dust is ripe, and the dust of the other plant brought into close contact with the female part of the flower operated on. A careful observation is necessary to perform this important office at that exact period when the flowers of both plants are in a proper state; if this be not attended to, there is little chance of success. Many splendid hybrid bulbs have been thus produced by Messrs. Sweet, Colvil, and others, one of which, *Amaryllis Psittacina var.*, we have adopted for our plate, and some beautiful *Passifloras*, by Mr. Milne. Fruits by Mr. Knight; and florist's flowers by almost every one eminent in that fancy.

Offsets, may be termed young radical bulbs, which, when separated from the parent-roots produce plants exactly similar to them, and never sport into varieties or monstrosities like the progeny of seeds, except from accidental causes.

Slips, are produced upon almost all herbaceous plants, and some shrubs, and issue from the plants near the surface of the ground, as in the case of *Auricula*, and similar plants. The proper period of their growth, when they are fit to be taken off, is when the part of the slip next the ground attains a somewhat firm texture, or what is technically called ripe. The operation of propagating by this means, consists simply of separating the slips from the parent-plant, by pulling or twisting them off, which is no difficult matter; and as they generally bring off a heel or piece of the old wood or stem of the plant with them, to which sometimes are appended roots, or

the embryo of them, they are then fit to pot off, or plant under a hand-glass, when they require to be shaded for a few days, and watered, and when sufficiently rooted planted out, where they are to remain.

Germes, or bulbs, are produced by the side of the parent bulbs, although sometimes above them, and are denominated radical or root-germes, to distinguish them from such as are produced on the stems of some plants, such as some species of *Allium*, *Lillium*, &c.; and such are denominated cauline, or stem-germes, or bulbs. Germes, or bulbs, whether radical or cauline, should be immediately planted after being removed from the parent-plant, as they are generally small, and very apt to be dried up, and soon lose their living principle if left long exposed to the air.

Runners occur in many hardy plants, but not very frequently with those which are inhabitants of our green-houses or conservatories. They are young plants, which proceed from long cord or thread-like appendages, which issue from many herbaceous plants, and generally strike root wherever they touch a favorable surface. When their roots are sufficiently formed, they may be taken entirely from the parent-plant, and treated as other young plants.

Suckers are of two kinds, that is, proceeding from the roots and also from the stem. The former have been defined to be merely runners under ground; some extending to a considerable distance from the original, and others rising quite close to it. As these in general are rooted under ground, all that is required is to take them up with a portion of root attached to them, and dispose of them as if perfectly-formed plants. The latter sort seldom have any roots attached to them while they remain on the parent, as is exemplified in the case of the pine-apple, the majority of succulent plants, &c. In propagating by them, it is necessary to remove them when they become partially hard at the bottom, after which, they should be laid by to dry for a few days, and afterwards potted, when they will, if kept moderately dry, make roots in a short time.

In regard to the various methods of propagation, which may be denominated artificial, we have, in their respective places throughout this work, had occasion to notice them, particularly in the Fruit Garden (*which see*).

	Soil.	Mode of Propagation.
Acacia	Loam and peat	Cuttings and seeds, some species, however, from cuttings of the roots.
Acæna	Loam and peat	Cuttings root freely.
Achillea	Loam and peat	Cuttings root freely.
Achyranthes	Peat and loam	Cuttings, when the wood is young.
Acrostichum	Loam and peat, or rotten wood	Dividing the roots, and by seed.
Actinocarpus	Loam and peat	Seeds, cultivated by being immersed in water.
Adenandria	Sandy loam or peat	Cuttings of the tips of the young wood, in fine sand, and cold frame.
Adiantum	Rotten wood, or sandy loam & peat.	Dividing the root, or by seed, like *Acrostichum*.
Agapanthus	Loam and rotten dung	Dividing the roots, and sometimes from seeds.
Agathosma	Sandy peat	Cuttings of the young wood.
Agave	Rich loamy soil	Suckers from the roots.
Ageratum	Light rich soil	Cuttings root freely.
Aitonia	Sandy loam and peat	Cuttings of the young wood.
Aizoon	Loam and lime rubbish	Cuttings root freely.
Albuca	Rich light loam	By suckers from the old bulb.
Allantodia	Loam and peat	Dividing the root, or by seed.
Aloe	Light mould & lime rub.	Suckers, which freely rise from the roots or stem.
Alonsoa	Light rich soil	Readily by cuttings and seeds.
Aloysia	Light rich soil	Cuttings of the young wood.
Alstræmeria	Very rich light mould	Seeds vegetate freely, if sown as soon as ripe, and by dividing the roots.
Alternanthera	Light rich soil	Readily increased by cuttings.
Amaryllis	Rich loam	By offsets from the bulbs.
Amellus	Loam and peat	Readily increased by cuttings.
Anabasis	Light loam	Cuttings of the young wood strike pretty freely.
Anacampseros	Sandy soil	By cuttings, or by leaves of the plant.
Anagallis	Light sandy soil	Cuttings of the plant strike readily during the spring and summer months.
Anagyris	Peat and loam	By cuttings.
Andersonia	Peat and loam	Cuttings of the young wood strike with care in March and April.
Andryala	Peat and loam	Cuttings root readily.
Anigozanthus	Peat and loam	By dividing at the root.
Anthericum	Sandy loam and peat	Generally from seed, or by cuttings.
Anthocercis	Loam and peat	Cuttings root freely.
Antholyza	Sandy loam	By seeds and offsets.
Anthospermum	Loam and peat	Cuttings strike freely.
Anthyllis	Loam and peat	Many of the species produce perfect seeds, which grow, and the others are propagated by cuttings.
Antirrhinum	Loam and peat	By cuttings.
Aotus.	Peat and loam	Cuttings of the young shoots strike pretty freely.

	Soil.	Mode of Propagation.
Aponogeton	Loam and peat	By offsets from the bulbs, or by seeds; plant while growing should be placed in a pond or cistern of water, and should be kept dry all winter.
Araucaria	Peat and loam	By seeds, when they can be imported; sometimes by cuttings; but the latter method seldom produces good plants.
Arbutus	Rich sandy loam	By budding or inarching, or the common Arbutus; sometimes by seeds and layers.
Arctopus	Loam and peat	By seeds.
Arctotheca	Loam and peat	By cuttings freely.
Arctotis	Peat and loam	The herbaceous species are increased by dividing them at the root; the shrubby sorts by cuttings.
Ardisia	Loam and peat	By cuttings of the young wood, and when seeds are obtained, by that process.
Arduina	Peat and loam	Cuttings strike root, but not readily.
Arenaria	Peat and loam	By seeds, and also by cuttings of the plant.
Arethusa	Rich loam and peat	By seeds, which should be sown as soon as ripe.
Aristea	Peat and loam	Readily propagated by dividing them at the root, as well as by seeds.
Aristolochia	Loam and peat	Easily propagated by cuttings.
Artemisia	Loam and peat	Easily propagated by cuttings.
Arthropodium	Sandy loam and peat	Multiplied by seed, or by dividing at the root.
Asclepias	Sandy peat and loam	By seeds and cuttings.
Ascyrum	Peat and loam	Cuttings of the young wood strike freely.
Aspalathus	Loam and peat	By seed, and by cuttings of the young wood.
Asparagus	Loam and peat	Cuttings will root best in a cold frame.
Aspidium	Peat and veget. mould	By seeds, and by dividing at the roots.
Asplenium	Peat and veget. mould	By seeds, and by dividing at the roots.
Aster	Peat and loam	By cuttings.
Astroloma	Sandy loam and peat	Cuttings of the young wood strike pretty freely.
Athanasia	Peat and loam	By cuttings.
Atraphaxis	Loam and peat	By cuttings.
Atriplex	Loam and peat	By cuttings.
Atropa	Loam and peat	By cuttings.
Aulax	Sandy loam	Not increased readily but by seeds which are imported.
Azalia	Sandy peat	Cuttings of the young wood strike pretty well in a bottom-heat.
Babiana	Sandy loam and peat	Rapidly by offsets from the roots, or by seeds.
Baccharis	Peat and loam	Cuttings of the young wood strike freely.
Bæckia	Peat and loam	Freely by cuttings.
Balsamita	Peat and loam	By cuttings.
Banksia	Peat and loam	By cuttings, but the best plants are from seeds imported from New-Holland.
Bartholina	Sandy loam and peat	Requires little water while in an inactive state.

	Soil.	Mode of Propagation.
Bauera	Peat and loam	Cuttings of the half-ripened wood strike freely.
Beaufortia	Peat and loam	By cuttings of the half-ripened wood.
Bejaria	Sandy peat	By cuttings of the young wood.
Berckheya	Peat and loam	Readily increased by cuttings.
Bignonia	Peat and loam	Cuttings of the young wood strike in heat; the old wood strike by layers: the former is the best method.
Billardiera	Peat and loam	By seeds, and also by cuttings.
Blæria	Sandy peat	By cuttings of the young wood.
Blandfordia	Sandy loam and peat	By seeds or suckers from the roots.
Blechnum	Peat and veget. mould	By seeds, and dividing the roots.
Bletia	Loam and peat	By dividing at the roots.
Bœhmeria	Loam and peat	Cuttings root freely.
Borbonia	Peat and loam	Cuttings of the young wood strike readily, if carefully shaded.
Boronia	Sandy peat	By cuttings.
Bosea	Loam and peat	Cuttings of the ripened wood strike pretty freely.
Bossiæa	Sandy peat	Cuttings of the half-ripened wood strike freely.
Bouvardia	Peat and loam	Readily by cuttings, and also by pieces of the roots.
Brabejum	Sandy loam and peat	By ripened cuttings of the wood.
Brachylæna	Peat and loam	Cuttings of the ripened wood strike freely.
Brachysema	Sandy peat	By layers, and sometimes by cuttings.
Brunia	Peat and loam	Freely by cuttings.
Brunsvigia	Rich light loam	By offsets from the bulbs.
Bryonia	Sandy loam	Cuttings of the young wood strike root readily.
Bubon	Peat and loam	Cuttings, taken off at a joint where the shoot is a little hard, strike freely.
Buddlea	Peat and loam	By cuttings.
Bupthalmum	Peat and loam	Readily by cuttings.
Bupleurum	Peat and loam	By cuttings.
Bursaria	Peat and loam	By cuttings of the young wood.
Burtonia	Sandy loam and peat	Cuttings of the young wood strike with care. It is altogether a delicate genus.
Bystropogon	Peat and loam	Readily by cuttings.
Cacalia	Poor sandy soil	By cuttings, which should be kept dry till rooted.
Cactus	Poor sandy soil	By cuttings, which should be kept dry till rooted.
Cæsia	Loam and peat	By seeds, or dividing at the roots.
Calceolaria	Loam and peat	By seeds and by cuttings.
Calendula	Peat and loam	Readily by cuttings.
Caleya	Sandy loam and peat	By seeds, and by dividing the roots.
Calla	Peat and loam	By offsets of the roots.
Callicoma	Peat and loam	Cuttings of the ripened wood strike freely.
Callistachys	Loam and peat	From seeds, which often ripen, and also from cuttings.
Callistemon	Peat and loam	Readily by seeds.
Calodendrum	Loam and peat	By cuttings of the ripened wood.
Calostemma	Peat and loam	By seeds which are produced on large plants, and also by offset bulbs.

	Soil.	Mode of Propagation.
Calothamnus	Peat and loam	By cuttings, which root freely if kept from damp.
Calytrix	Sandy loam and peat	By cuttings, but not very readily.
Camellia	Sandy loam and peat	By seeds, cuttings, and by grafting and inarching on stocks of their own species.
Camphorosma	Peat and loam	By cuttings.
Campylia	Sandy peat and loam	By cuttings taken off at a joint.
Canarina	Light sandy loam	By dividing the roots, or by cuttings of the stem.
Capraria	Loam and peat	By cuttings.
Carthamus	Loam and peat	By cuttings.
Cassia	Peat and loam	By seeds or cuttings.
Cassine	Peat and loam	Cuttings of the ripened wood strike freely.
Cassuarina	Peat and loam	By cuttings, and often by imported seeds.
Ceanothus	Sandy loam and peat	By cuttings.
Celastrus	Peat and loam	By cuttings.
Centaurea	Peat and loam	Cuttings strike freely.
Cestrum	Loam and peat	By cuttings.
Cheilanthus	Peat and veget. mould	By seeds, and by dividing the roots.
Cheiranthus	Peat and loam	Cuttings strike readily.
Chenolea	Peat and loam	By cuttings.
Chimonanthus	Peat and loam	By layers in spring; by cuttings of the young wood in summer; but in greater quantity from seeds imported.
Chironia	Sandy peat	Cuttings root freely.
Chorizema	Peat and light loam	By cuttings, but much better from seeds.
Chrysanthemum.	Peat and loam	Cuttings root freely, and some species by dividing the roots.
Chrysocoma	Peat and loam	By cuttings.
Cineraria	Loam and peat	By cuttings.
Cissus	Peat and loam	Strike by cuttings in bottom-heat.
Cistus	Peat and loam	Most of the species propagate freely by cuttings, and all of them from seeds, which ripen abundantly.
Citrus	Rich soil	By seeds, cuttings, inarching, and grafting.
Clerodendrum	Loam and peat	By cuttings.
Clethera	Loam and peat	By cuttings, and also by seeds, which ripen often.
Cliffortia	Peat and loam	By cuttings.
Cluytia	Peat and loam	Cuttings strike freely.
Cobœa	Rich soil	Generally by seeds, and sometimes by cuttings.
Commelina	Peat and loam	By seeds, and dividing the roots.
Convolvulus	Loam and peat	Some of the species by cuttings of the roots, others by seeds, and several by cuttings of the branches.
Coris	Peat and loam	Should be perpetuated by seeds, but is often propagated by cuttings.
Coronilla	Loam and peat	By cuttings freely.
Corrœa	Peat and loam	Cuttings of the ripened wood strike pretty freely, particularly *C. alba* and *Veridiflora*, and are used as stocks, on which to inarch or graft the other rarer sorts.

CHIRONIA DECUSSATA.

Drawn at Mr Colvills'
by E.D. Smith.

London: Published by Thomas Kelly, Paternoster Row, October 1, 1829.

	Soil.	Mode of Propagation.
Crassula	Sandy soil.	By cuttings, which should be partially dried before planting, as, being succulent, are apt to damp off.
Crotalaria.	Peat and loam	By seeds, which often ripen, and also by cuttings of the young wood.
Crowea	Peat and loam	By cuttings.
Crucianella	Loam and peat	Cuttings root freely.
Cryptospermum	Loam and peat.	Cuttings root freely.
Cunonia	Loam and peat	Ripened cuttings strike freely.
Cupressus	Peat and loam	Imported seeds are to be preferred, but some of the species strike by cuttings.
Curtisia	Loam and peat	Cuttings of the ripened wood strike freely.
Cussonia	Peat and loam	By cuttings.
Cyanella	Peat and loam	By offsets, and also by seeds.
Cyclamen	Peat and loam	This genus may be said to be propagated by seeds only, which ripen under good management.
Cyclopia	Loam and peat	Cuttings of the young wood strike pretty freely.
Cynanchum	Loam and peat	By cuttings.
Cyrilla	Sandy loam and peat	The green-house species is not readily propagated by cuttings. When seeds can be obtained, they should be carefully sown.
Cyrtanthus	Light rich mould	If care be taken to assist the impregnation of the flowers, seeds will be abundantly produced. They may be propagated also by offsets from the bulbs.
Cytissus	Peat and loam	By seeds and cuttings.
Dias.	Peat and loam	By cuttings of the roots in a moderate temperature, and also by seeds.
Dampiera	Loam and peat.	Cuttings of the young wood strike freely.
Daphne	Loamy rich soil	By cuttings of the young wood, but with greater certainty from the ripened shoots, taken off at a joint, in a moderate heat.
Daviesia	Sandy loam and peat	Cuttings about half ripe strike pretty freely. *D. latifolia* is not easily propagated.
Dendrobium	Sandy peat	By dividing the roots.
Dianella	Sandy loam and peat	Readily by seeds, or by dividing the roots.
Dicksonia.	Sandy loam and peat	By seeds, or by dividing the roots of old plants.
Digitalis	Peat and loam	By cuttings, but more readily from seeds, which ripen frequently.
Dilatris	Peat and light loam	By offsets, bulbs, and also by seeds, which should be sown in leaf-mould.
Dillwynia	Sandy peat	By cuttings, which require great care.
Dimacria	Light loam & sandy peat.	By the little tubers of the roots.
Dionæa	Light peat & *sphagnum*.	This curious plant is often lost, more for want of a proper atmosphere than for want of proper soil. It should be kept damp, and partially shaded.

	Soil.	Mode of Propagation.
Diosma	Peat and loam	Cuttings of the young shoots root freely.
Disandria	Light loam	By cuttings freely.
Disperis	Loam and peat	By offsets.
Dodonæa	Loam and peat	By cuttings. By no means a showy genus, but much cultivated.
Dolichos	Loam and peat	From seeds and cuttings.
Doodia	Sandy peat and loam	Seeds vegetate freely, & the roots are often divided.
Doryanthes	Peat earth	By suckers which rise from the roots of old plants, but not very frequently. Imported roots or seeds are most to be depended on.
Dorycnium	Peat and loam	By seeds and cuttings.
Dracocephalum	Peat and loam	By cuttings.
Drimia	Sandy loam and decayed leaves	By offsets from the bulbs, and from seeds.
Drosera	Peat and *sphagnum*	Few Foreign species are cultivated.
Dryandra	Peat and loam	By cuttings, and by imported seeds.
Echites	Sandy loam and peat	By cuttings, which root freely.
Echium	Peat and loam	Part of the genus by cuttings, and others by layers, but most by seeds.
Edwardsia	Peat and loam	By seeds, and also by cuttings.
Ekebergia	Loam and peat	By cuttings, which should not have their leaves shortened.
Elæocarpus	Peat and loam	Cuttings of the ripe wood strike pretty freely; but as seeds are sometimes produced on large plants, they should be preferred.
Elegia	Sandy peat	By dividing the roots.
Elichrysum	Sandy peat	By cuttings of the young wood; and some cultivators succeed by making cuttings of large pieces of the branches.
Empetrum	Sandy peat	Cuttings of the young wood strike freely.
Empleurum	Sandy peat	By cuttings of the young wood.
Entelea	Peat and loam	Seeds sometimes ripen, by which plants are obtained, as well as by cuttings of the half-ripe wood.
Epacris	Sandy peat	This beautiful genus is not very readily increased. Young wood is usually chosen for cuttings, which succeed best when planted in autumn or winter.
Erica	Sandy peat	Most of the species are propagated by cuttings of the young wood, and many of them ripen their seeds, which vegetate freely.
Eriocephalus	Peat and loam	By cuttings of the young wood.
Eriospermum	Loam and peat	By offsets from the roots, or by seeds.
Erodium	Rich loam	By cuttings of the shoots, by seeds, and by cuttings of the roots.
Erythrina	Rich loam and rotten dung	Readily by cuttings of the young shoots, when about half ripe.

	Soil.	Mode of Propagation.
Eucalyptus	Peat and loam	Vast quantities are originated from imported seeds. They propagate by cuttings, although not freely.
Euchilus	Peat and loam	By cuttings.
Euclea	Loam and peat	By cuttings.
Eucomis	Loam and peat	By offsets from the bulbs, or by planting the leaves, which will produce bulbs at the base.
Eugenia	Sandy loam or peat	Cuttings of the ripe wood strike freely.
Euphorbia	Sandy loam	Cuttings of most sorts root freely.
Eustrephus	Peat and loam	By cuttings, and sometimes by seeds.
Eutaxia	Peat and loam	Cuttings of the young wood strike freely.
Exacum	Peat and loam	Readily by seeds, and also by cuttings.
Excœcaria	Light rich soil	By cuttings.
Fabricia	Peat and loam	By cuttings.
Falkia	Peat	By cuttings.
Ferraria	Light loam and peat	By offsets from the bulbs, and from seeds which ripen freely.
Ficus	Peat and loam	By cuttings.
Fuchsia	Peat and loam	All the genus readily by cuttings.
Galaxia	Peat & decayed leaves	By offsets from the roots.
Galenia	Peat and loam	The young wood strikes freely.
Gardenia	Rich light soil	Most freely from cuttings.
Gastrolobium	Peat and loam	Seeds sometimes ripen, by which it is increased, and also by cuttings, which do not root freely.
Gazania	Light rich mould	Cuttings strike freely.
Gelsemium	Peat and loam	By cuttings.
Genista	Peat and loam	Cuttings of the young wood strike readily.
Geranium	Peat and loam	By seeds; cuttings of the roots of some species, and of the branches of others.
Gladiolus	Sandy loam and leaf-mould	By offsets from the roots.
Globularia	Loam and peat	Cuttings of the young wood root readily.
Glossodia	Sandy loam and peat	By seeds, and also by offsets from the roots.
Glycine	Peat and loam	Seeds often ripen, from which good plants are obtained. They also propagate from cuttings.
Gnaphalium	Peat and loam	Cuttings strike root with a little care, and seeds are sometimes obtained.
Gnidia	Peat and loam	By cuttings of the young wood.
Gomphocarpus	Loam and peat	By seeds, which are often produced; also by cuttings, in a mild bottom-heat.
Gompholobium	Peat	By cuttings and seeds.
Goodenia	Peat and loam	By cuttings.
Goodia	Peat and loam	Seeds often ripen by which they are obtained, and also by cuttings.
Gordonia	Peat and loam	Cuttings of the ripened wood strike root pretty freely.
Grevillea	Peat and loam	Cuttings of the ripe wood strike with care, and sometimes seeds are obtained of some of the species.

	Soil.	Mode of Propagation.
Grewia	Loam and peat	By cuttings of the ripe wood.
Grielum	Sandy gravel	Cuttings root readily.
Gunnera	Loam and peat	By dividing at the root, and cultivated as an aquatic plant.
Hæmanthus	Rich sandy loam	By offsets from the roots.
Hæmodorum	Loam and peat	By dividing the roots.
Hakea	Peat and loam	By cuttings of the ripe wood, put in, in winter or early in spring.
Halleria	Peat and loam	By ripened cuttings.
Hallia	Loam and peat	Cuttings of the young wood strike freely.
Hamiltonia	Loam and peat	By cuttings of the ripened wood.
Hebenstretia	Peat and loam	Cuttings of the young wood strike freely.
Hedysarum	Light rich soil	Both by seeds and by cuttings of the young wood.
Helianthemum.	Sandy loam and peat.	By seeds, & also by cuttings of the ripened shoots.
Heliophila	Sandy loam and peat	Principally by seeds, although cuttings of the young wood will strike root.
Heliotropium	Peat and loam	By cuttings of the young wood.
Hermannia	Peat and loam	By cuttings.
Herniaria	Light soil	Cuttings of the young wood root freely.
Hibbertia	Sandy loam and peat	By cuttings.
Hibiscus	Peat and loam	By seeds, and by cuttings.
Hippia	Light soil	By cuttings of the young wood.
Hippocrepis	Loam and peat	Cuttings strike freely.
Hoarea	Light turfy soil	This genus is increased by small tubers from the roots, which should not be planted deep nor yet much watered.
Hopea	Loam and peat	By cuttings.
Hovea	Peat and loam	By cuttings, and sometimes from seeds.
Hovenia	Peat and loam	Cuttings of the ripened wood strike freely.
Hoya	Rich light soil	By cuttings in a brisk heat. Every leaf taken close off the plant and potted will make a plant, if kept in a good heat.
Hudsonia	Peat soil	This plant is difficult either to keep or to increase. Cuttings sometimes will root.
Hydrangea	Rich soil	Most readily by cuttings either of the young or old wood.
Hypericum	Peat and loam	Cuttings of the young wood strike freely.
Hypoxis	Sandy loam and peat	By offsets, and by seeds.
Iberis	Rich light soil	By cuttings freely.
Ilex	Rich soil	By cuttings of the ripened wood.
Illicium	Loam and peat	Cuttings of the young wood strike freely.
Indigofera	Peat and loam	Cuttings of the young wood strike freely.
Ionidium	Loam and peat	By cuttings.
Ipomæa	Rich light soil	By cuttings in spring, in a bottom heat.
Iris	Peat and loam	By the suckers which they throw up from their roots.
Isopogon	Peat and loam	Like most other plants allied to the genus *Protea*, they are difficult to propagate. Seeds are sometimes imported by which a stock is procured, but cuttings seldom answer.

	Soil.	Mode of Propagation.
Ixia	Peat and loam	By offsets from the bulbs; while in an inactive state should be kept dry.
Ixodia	Peat and loam	Young cuttings root freely.
Jacksonia	Peat and loam	By cuttings of both young and ripened wood.
Jasminum	Peat and loam	Cuttings root freely.
Jenkinsonia	Turfy loam and peat	By cuttings.
Justicia	Peat and loam	Cuttings root freely.
Kerria	Peat and loam	By cuttings and suckers from the roots.
Kennedia	Peat and loam	By seeds and cuttings.
Kiggelaria	Loam and peat	Cuttings of the ripened wood strike freely.
Lachenalia	Loam and peat	By offsets from the bulbs
Lambertia	Peat and loam	Ripened cuttings, taken off at a joint before they begin to grow afresh, may be struck, but not without difficulty.
Lanaria	Sandy loam and peat	By dividing the roots.
Lapeyrousia	Light rich soil	Cultivated like *Ixia*, &c.
Larochea	Sandy loam	By cuttings.
Lasiopetalum	Peat and loam	Cuttings of the ripened wood strike freely.
Lavendula	Peat and loam	Cuttings of the young wood strike freely.
Lavatera	Peat and loam	From seeds, which often ripen, and also by cuttings of the ripened wood.
Laurus	Peat and loam	Cuttings of the ripened wood strike root in a bottom-heat pretty freely.
Lebeckia	Peat and loam	By cuttings of the young wood.
Lechenaultia	Peat and loam	By cuttings of the young wood.
Leonotis	Rich soil	Cuttings of the young wood strike freely.
Leontice	Peat and loam	By seeds, and by dividing the roots.
Lepidium	Light soil	By seeds or cuttings.
Leptospermum	Peat and loam	By seeds and cuttings; the latter is preferred, as affording plants that will sooner come into flower.
Leucadendron	Light loam	Sometimes increased by cuttings, but not without difficulty. Imported seeds are sometimes to be procured.
Leucopogon	Peat and loam	The very tips of the young shoots will strike with care, but not readily.
Leucospermum	Light loam	Same as *Leucadendron*.
Leysera	Peat soil	By cuttings.
Liatris	Peat soil	By seeds, or dividing the roots.
Lightfootia	Loam and peat	Cuttings of the young shoots strike freely.
Ligustrum	Loam and peat	Cuttings of the young wood strike freely, or by inarching on the common *Privet*.
Linaria	Peat and loam	Cuttings strike freely.
Linum	Peat and loam	By cuttings of the young wood.
Liparia	Peat and loam	The very tips of the young shoots should be chosen for cuttings, which, with care, will strike roots.
Lobelia	Any rich soil	Readily by cuttings.

	Soil.	Mode of Propagation.
Loddigesia	Sandy loam and peat	Cuttings of the young wood strike freely.
Logania	Peat and loam	Cuttings of the ripened wood will root.
Lomatia	Peat and loam	Ripened cuttings taken off at a joint will strike root.
Lonicera	Rich light soil	Cuttings of the ripened wood strike root freely.
Lotus	Peat and loam	From seeds which ripen in most species freely, and also by cuttings of the young wood.
Lychnis	Peat and loam	By cuttings or seeds.
Lycium	Loam and peat	Ripened cuttings strike freely.
Lythrum	Peat and loam	By cuttings of the young wood.
Magnolia	Peat soil	By cuttings of the ripened wood, and some of them by inarching or budding on the common sorts.
Mahernia	Loam and Peat	Young cuttings strike freely.
Malva	Loam and peat	By seeds, and cuttings of the young wood.
Marica	Loam and peat	By offsets, and also by seeds.
Marrubium	Light rich soil	Cuttings strike freely.
Massonia	Sandy loam and peat	By seeds, and by offsets from the bulbs.
Mathiola	Light soil	Readily by cuttings.
Maurandia	Light rich soil	Freely by seeds, and also by cuttings.
Medicago	Peat and loam	By seeds and by cuttings.
Melaleuca	Peat and loam	Ripened cuttings not too old strike pretty freely. Seeds are also sometimes ripened, which readily vegetate.
Melanthium	Sandy loam and peat	By seeds or offsets.
Melia	Loam and peat	By seeds which often ripen.
Melianthus	Peat and loam	Readily by cuttings.
Menispermum	Loam and peat	Cuttings propagate readily.
Mesembryanthemum	Light soil	Freely by cuttings, if kept dry.
Mespilus	Loam and peat	By cuttings.
Metrosideros	Peat and loam	Best from seeds; cuttings of the ripened wood sometimes strike, but not without difficulty.
Mikania	Peat and loam	By cuttings.
Mimulus	Light rich soil	Readily by cuttings.
Mirbelia	Sandy loam and peat	By cuttings, and also by seed, which sometimes ripen.
Monsonia	Turfy loam	By cuttings, or pieces of the root.
Montinia	Loam and peat	By cuttings.
Morina	Light rich soil	By seeds, and by dividing at the root.
Mundia	Sandy peat	Cuttings of the young wood strike freely.
Murraya	Peat and loam	By cuttings in a bottom-heat.
Myoporum	Loam and peat	By cuttings.
Myrica	Loam and peat	Cuttings of the young wood strike freely.
Myrsine	Loam and peat	By cuttings.
Myrtus	Peat and loam	By cuttings not too ripe.
Nandina	Peat and loam	Cuttings, with their leaves not shortened, root freely.
Nemesia	Rich soil	Cuttings of the young wood strike freely.

	Soil.	Mode of Propagation.
Nerium	Rich soil	By cuttings of the young wood.
Nicotiana	Rich soil	By seeds.
Nivenia	Sandy loam	Not readily; ripened cuttings, however, sometimes succeed.
Ocymum	Light rich soil	By cuttings.
Œdera	Peat and loam	By young cuttings.
Œnothera	Peat and loam	Cuttings root freely.
Olea	Rich soil	By cuttings, but more readily by grafting on the common *Privet*.
Ononis	Peat and loam	Cuttings strike freely, and seeds are sometimes ripened which vegetate freely.
Onosma	Peat and loam	By cuttings.
Ophiopogon	Peat and loam	By dividing the roots.
Origanum	Loam and peat	Cuttings strike freely.
Ornithogalum	Loam and peat	By offsets from the bulbs.
Osteospermum	Peat and loam	By cuttings freely.
Osyris	Loam and peat	Cuttings of the ripened wood strike freely.
Othonna	Peat and loam	Cuttings strike freely.
Oxalis	Light rich soil	Sometimes by seeds, and generally by offsets from the bulbs.
Oxylobium	Peat soil	Cuttings strike root with care, and some of the species ripen seeds.
Pallasia	Light rich soil	By cuttings.
Pancratium	Light rich soil	By offsets from the bulbs, and sometimes from seeds.
Passerina	Peat and loam	Young cuttings strike freely.
Passiflora	Rich soil	By cuttings, which should be taken off while very young; some of the species perfect seeds by which hybrides are produced.
Patersonia	Peat and loam	By dividing at the root.
Pavonia	Peat and loam	As seeds often ripen, it may be increased by them, or by cuttings of the young wood.
Pelargonium	Light rich soil	By cuttings, seeds, &c.
Pentzia	Peat and loam.	By cuttings.
Persoonia	Peat and loam	Not readily; cuttings of the ripened wood sometimes root.
Phlomis	Peat and loam	By cuttings.
Phormium	Peat and loam	By offsets from the root.
Photinia	Peat and loam	By cuttings of the ripened wood, and also by grafting or inarching on the different kinds of *Pyrus* or *Mespilus*.
Phylica	Peat and loam	Cuttings of the young wood strike freely.
Phyllolobium	Loam and peat	Cuttings of the young wood will root freely.
Pimelea	Sandy peat	By cuttings of very young wood, and also by seeds.
Pinckneya	Peat and loam	Cuttings root freely.
Pinus	Any ordinary soil	Most of the species are difficult to perpetuate otherwise than by seeds; some will, however, strike by cuttings.
Pisonia	Loam and peat	By cuttings.

	Soil.	Mode of Propagation.
Pistachia	Loam and peat	Cuttings of the ripened wood strike root, but require a long time.
Pittosporum	Peat and loam	Cuttings, which do not, however, strike very freely.
Platylobium	Peat soil	Seeds are sometimes ripened which produce fine plants; they are also propagated by cuttings.
Plectranthus	Peat and loam	Young cuttings root freely.
Plectronia	Peat and loam	Cuttings of the ripened wood strike root.
Plumbago	Peat and loam	Cuttings root readily in a bottom heat.
Podolepis	Loam and peat	By dividing near the root.
Podocarpus	Peat and loam	Not readily propagated by cuttings.
Podolobium	Sandy peat	Best by seeds, although cuttings strike pretty freely.
Pogonia	Sandy peat	By offsets from the roots.
Polygala	Peat and loam	From the nature of the plants, it is difficult to get many cuttings of them; if the leading shoots be topped, plenty of lateral shoots will be produced, which will strike root as cuttings.
Pomaderris	Loam and peat	Cuttings will strike root, but as seeds are sometimes obtained, they should be preferred.
Poterium	Peat and loam	Young cuttings ripen freely.
Prasium	Light rich soil	By cuttings.
Prostanthera	Peat and loam	By cuttings.
Protea	Sandy loam.	This genus is not readily propagated otherwise than by seeds. Cuttings are sometimes rooted, but not readily, and that only in the case of a few species.
Prunus	Peat and loam	Cuttings of the young wood strike pretty freely.
Psoralea	Peat and loam	By cuttings freely.
Pteronia	Peat and loam	Cuttings propagate freely.
Pultenæa	Sandy loam and peat	By cuttings.
Punica	Peat and loam	By ripened cuttings.
Rafnia	Sandy loam and peat	Best by seeds, but will also succeed by cuttings.
Raphiolepis	Loam and peat	Cuttings of the ripened wood strike freely.
Reaumuria	Peat and loam	By cuttings.
Relhania	Peat and loam	By cuttings.
Restio	Peat and loam	By dividing the roots.
Rhagodia	Peat and loam	By cuttings.
Rhamnus	Peat and loam	By cuttings of the ripened wood.
Rhus	Peat and loam	By cuttings of the ripened wood.
Ricinus	Loam and peat	Cuttings, taken off at a joint, freely strike root.
Roelia	Sandy peat	By cuttings.
Royena	Loam and peat	Ripened cuttings strike freely.
Rubus	Peat and loam	By cuttings.
Ruellia	Rich light soil	By cuttings.
Ruscus	Any light soil	By dividing the roots.
Ruta	Any light soil	Cuttings of the young shoots readily strike root.
Sagittaria	Peat and loam	An aquatic genus; by dividing at the root.
Salicornia	Any light soil	By cuttings.

	Soil.	Mode of Propagation.
Salvia	Any rich soil	By cuttings freely.
Satureja	Rich light soil	By cuttings.
Satyrium	Sandy loam and peat	By seed.
Scabiosa	Peat and loam	By seeds, and also by cuttings.
Scævola	Peat and loam	By cuttings.
Schinus	Loam and peat	Cuttings of the ripened wood, having the leaves left unshortened, strike in a mild bottom-heat.
Schisandra	Sandy peat and loam	Ripened cuttings root freely.
Schotia	Peat and loam	Ripened cuttings root freely.
Scleroxylon	Loam and peat	Ripened cuttings strike pretty freely.
Scottia	Loam and peat	Is said to be readily propagated by cuttings, taken off at a joint while young; the only plants we have seen have been originated from seeds: it is still rare.
Scutellaria	Light rich soil	By cuttings.
Selago	Peat and loam	Cuttings strike freely.
Sempervivum	Light soil	Cuttings taken off and dried for a few days root freely.
Senecio	Peat and loam	Most readily by cuttings.
Septas	Sandy loam and peat	Dividing the roots.
Sida	Light soil	By seeds, and also by cuttings.
Sideritis	Light rich soil	Cuttings root pretty freely.
Sideroxylon	Loam and peat	The half-ripened shoots root, but not without difficulty.
Silene	Light soil	Readily by cuttings.
Smilax	Loam and peat	By dividing at the root.
Solanum	Light rich soil	Either by cuttings or seeds.
Sorocephalus	Light loam	Treated like *Protea*, &c.
Sowerbæa	Peat soil	By dividing at the root.
Sparmania	Peat and loam	By cuttings readily.
Spartium	Peat and loam	By seeds, and sometimes by cuttings of the young wood.
Sphærolobeum	Sandy peat	By seeds and cuttings.
Spielmannia	Peat and loam	Cuttings root freely.
Spigelia	Sandy peat	Cuttings root freely.
Sprengelia	Sandy peat	By cuttings of the young wood.
Stachys	Peat and loam	By cuttings freely.
Statice	Sandy loam and peat	By seeds, and by dividing the plant near the roots.
Stenanthera	Sandy peat	By cuttings of the young wood.
Stenocarpus	Loam and peat	Ripened cuttings strike root, but not freely.
Stenochilus	Peat and loam	Ripened cuttings strike root, but not freely.
Sterculia	Rich loam and peat	Ripened cuttings strike freely.
Stevia	Sandy loam and peat	By cuttings.
Stillingia	Rich light soil	Readily by cuttings.
Stobæa	Rich light soil	By cuttings.
Struthiola	Peat and loam	By cuttings of the young wood.
Stylidium	Sandy peat	By cuttings.
Styphelia	Sandy loam and peat	Cuttings of the young wood root freely.

	Soil.	Mode of Propagation.
Sutherlandia	Loam and peat	Readily by seeds.
Swainsonia	Loam and peat	By seeds, and also by cuttings.
Tarchonanthus.	Peat and loam	By cuttings.
Telopea	Light loam and peat	There are but few instances of its propagating by any other means than from seeds, which are not often imported: hence its being so scarce.
Tempeltonia	Loam and peat	By cuttings.
Teucrium	Peat and loam	Cuttings root freely.
Thomasia	Peat and loam	By cuttings.
Thuja	Peat and loam	By cuttings.
Trachelium	Peat and loam	By seeds or cuttings.
Tristania	Peat and loam	By cuttings of the half-ripened wood.
Tritoma	Peat soil	By dividing the roots.
Tropæolum	Rich light soil	Cuttings root freely.
Tulbagia	Light sandy soil	By offsets from the bulbs.
Uvularia	Loam and peat	By dividing at the roots.
Veltheimia	Light loam	As most bulbous plants.
Veronica	Peat and loam	By cuttings.
Vinca	Peat and loam	Cuttings of the young wood root freely.
Villarsia	Peat and loam	An aquatic genus, increased by dividing the roots, or by seeds, which are produced in abundance.
Viminaria	Sandy peat	Cuttings of the young wood root freely.
Virgilia	Loam and peat	Cuttings of the young wood strike freely.
Vitex	Loam and peat	By cuttings.
Wachindorfia	Sandy loam and peat	By offsets from the bulbs, or by seeds.
Watsonia	Sandy loam and peat	In the same way as the last genus.
Westringia	Peat and loam	Cuttings of the young shoots root freely.
Witsenia	Sandy peat	By offsets from the roots, or by seeds.
Woodwardia	Peat and veget. mould	Like most others of the Fern tribes, may be increased by dividing the roots, or by seeds.
Xerotes	Loam and peat	By dividing at the root.
Xylomelum	Peat and loam	By cuttings of the young wood, but with considerable difficulty.
Yucca	Rich loamy soil	Suckers from the roots and stem are the natural mode of propagation.
Zieria	Peat and loam	Cuttings of the young wood root freely.
Zygophyllum	Peat and loam	By cuttings, which root freely.

A SYSTEMATIC CATALOGUE OF CONSERVATORY PLANTS.

ACACIA.
- Undulata.
- Oxycedrus.
- Impressa.
- Pendula.
- Cordifolia.
- Verticillata.
- Juniperina.
- Taxifolia.
- Diffusa.
- Lunata.
- Suaveolens.
- Floribunda.
- Uncinata.
- Longissima.
- Longifolia.
- Viscosa.
- Linifolia.
- Falcata.
- Dicipiens.
- Hybrida.
- Armata.
- Alata.
- Pulchilla.
- Strigosa.
- Nigricans.
- Pubescens.
- Discolor.
- Mollissima.
- Dealbata.
- Decurrens.

ANTHYLLIS, Barba-jovis.

ALSTRÆMERIA, Simsii.

ANDERSONIA, Springelioides.

ANDROMEDA, Ovalifolia.

ANIGOSANTHUS, Flavida.

ARBUTUS.
- Canariensis.
- Andrachne.
- Laurifolia.

ARDESIA, Lentiginosa.

ASTER, Argophyllas.

AZALEA
- Indica.
  - a *Var. Punicea.*
  - b *Alba.*
  - c *Purpuria.*
  - d *Lutea.*
- Sinensis.

ARAUCARIA.
- Brasiliana.
- Excelsa.

BEAUFORTIA.
- Decusata.
- Sparsa.

BÆCKEA.
- Virgata.
- Frutescens.

BERBERIS.
- Pinnata.
- Fasicularis.

BANKSIA: (all the species.)

BORBONIA.
- Cordata.
- Trinerva.
- Lanciolata.

BORONIA.
- Alata.
- Denticulata.
- Pinnata.
- Serrulata.

BOSSIÆA.
- Linifolia.
- Scolopendrium.

BURCHELLIA.
- Capensis.
- Parviflora.

CALLICOMA, Serratifolia.

CALCEOLARIA.
- Corymbosa.
- Rugosa.
- Integrifolia.
- Scabiosæfolia.

CALLISTACHYS.
- Ovata.
- Lanciolata.

CALLISTEMON.
- Speciosum.
- Lanciolatum.
- Salignum.
- Marginatum.
- Rigidum.
- Lineare.
- Formosum.
- Microphyllum.

CALOTHAMNUS.
- Clavatus.
- Quadrifidus.
- Villosus.

CAMELLIA JAPONICA: (all the species and varieties.)

CARMICHÆLIA, Austeralis.

CANNA.
- Flacida.
- Glauca.
- Limbata.
- Indica.
- Iridiflora.

CASUARINA.
- Equisetifolia.
- Torulosa.
- Stricta.
- Distyla.

CHORIZEMA.
- Henchmanni.
- Ilicifolia.

CLETHERA, Arborea.

CORRÆA.
- Alba.
- Speciosa.
- Virens.
- Pulchilla.

CROWEA, Saligna.

CURTISIA, Fuginia.

CUSSONIA.
- Spicata.
- Thyrciflora.

CYCAS, Revoluta.

CUNONIA, Capensis.

DAVIESIA.
- Latifolia.
- Corymbosa.
- Ulicina.
- Glauca.

DAIS, Cotonifolia.

DAPHNE, Odora.

DATURA, Arborea.

DILLWYNIA.
- Pungens.
- Rudis.
- Phylicifolia.
- Florabunda.
- Ericæfolia.

DORYANTHUS, Excelsa.

DONIA, Viscosa.

DRACÆNA.
- Australis.
- Indivisa.
- Undulata.

DRYANDRIA: (all the species.)

ELÆOCARPUS, Cyaneus.

ENTELEA, Arborescens.

ERYTHRINA.
- Crista-galli.
- Laurifolia.

ENKIANTHUS.
- Quinqueflorus.
- Reticulatus.

EPACRIS.
- Grandiflora.
- Purpurescens.

EUDESMIA, Tetragona.

EUCALYPTUS.
- Globulus.
- Obliqua.
- Piperita.
- Corymbosa.
- Robusta.

EUGENIA.
Smithii.
Myrtifolia.
EUCHILUS, Obcordatus.
EUTAXIA, Myrtifolia.
FABRICIA.
Myrtifolia.
Lævigata.
Sericia.
FICUS.
Australis.
Elastica.
Capensis.
FUCHSIA: (all the species.)
GASTROLOBUM, Bilobum.
GOODIA.
Latifolia.
Pubescens.
Retusa.
Sub-pubescens.
GNIDIA: (all the species.)
GOMPHOLOBIUM.
Grandiflorum.
Polymorphum.
GREVILLEA: (all the species.)
GORDONIA, Lisianthus.
HAKEA: (all the species.)
HOVEA.
Chorizemæfolia.
Celsi.
Lanciolata.
HOVENIA, Dulsis.
HUMEA, Elegans.
ILLICIUM.
Floridanum.
Anisatum.
Parviflorum.
INDIGOFERA, Australis.
JACKSONIA, Scoparia.
JACARANDA, Mimosifolia.
LAGERSTRÆMIA, Indica.
LAMARKIA, Dentala.
LASIOPETALUM.
Arborescens.
Seringia Platyphylla.
Ferrugineum.
Parviflorum.
Purpureum.
Thomasia Purpurea.
Solanacea.
Thomasia Solanacea.
Quercifolia.
Thomasia Quercifolia.
LEPTOSPERMUM: (all the species.)
LOMATIA, Longifolia.
LODDIGESIA, Oxalidifolia.
MAGNOLIA.
Fuscata.
Annonafolia.
Pumila.
MELALEUCA: (all the species.)
METROSIDEROS.
Hispida.
Floribunda.
Glomulifera.
Angustifolia.
Costata.
NANDINA, Domestica.
NERIUM, Splendens.
PÆONIA.
Moutan.
Var. Papaveracea.
PITTOSPORUM: (all the species.)
PIMELEA: (all the species.)
PLATYLOBIUM.
Formosum.
Triangulare.
Parviflorum.
PLUMBAGO, Capensis.
PODALYRIA.
Sericea.
Biflora.
Styracifolia.
Hirsuta.
Buxifolia.
POLYGALA.
Attenuata.
Oppositifolia.
Cordifolia.
Latifolia.
Myrtifolia.
Bracteolata.
Simplex.
Speciosa.
Teretifolia.
Borboniæfolia.
Ligularis.
Umbullata.
POMADERRIS.
Apetala.

Elliptica.
Acuminata.
PROSTANTHERA.
Lasianthos.
Denticulata.
PULTENÆA: (all the species.)
RHODODENDRON, Arborea.
RUTA, Albiflora.
STENANTHERA, Pinifolia.
STENOCHILUS, Maculata.
STENOCARPUS, Saligna.
STRUTHIOLA: (all the species.)
TELOPEA, Speciossisima.
TEMPELLONIA.
Glauca.
Retusa.
TRISTANIA, Nerifolia.
WESTRINGIA, Rosmarinifolia.
VIMINARIA, Denudata.
VIRGILIA, Intrusa.

GREEN-HOUSE PLANTS.

ACACIA: (*as in Conservatory List.*)
ACHILLEA, Ægyptiaca.
ACROSTICUM.
Alcicorne.
Aureum.
Vellum.
Lingua.
AGAPANTHUS.
Umbullatus.
Minor.
AITONIA, Capensis.
ALOE: (many species.)
ALONSOA.
Incisifolia.
Acutifolia.
Linearis.
ALSTRÆMERIA.
Pelegrina.
Hookeri.
Flos-Martini.
Ovata.
AMARYLLIS: (many species.)
ANAGALLIS.
Latifolia.
Colina.
Monelli.
Linifolia.
ANDERSONIA, Sprengelioides.
ANIGOSANTHUS, Flavida.
ANTHOLYZA, (many species.)
AOTUS.
Virgata.
Villosus.
ANTHYLLIS.
Linifolia.
Barba-jovis.
Hetrophylla.
ARCTOTUS.
Acaulis.
Tricolor.
Grandiflora.
Speciosa.
Bicolor.
Arborescens.
ASPALATHUS.
Carnosa.
Argentea.
Ciliaris.
Albens.
Hispida.
ARDUINA, Bispinosa.
ARISTEA.
Cyanea.
Spiralis.
Capitata.
Melaleuca.
ASPIDIUM, Axillare.
ASPLENIUM.
Dentex.
Odontites.
Hemionitis.

ASTROLOMA, Humifusum.
AULAX, Umbullata.
AZALIA: (*as in Conservatory List.*)
BÆKIA, Virgata.
BANKSIA: (the whole genera.)
BORBONIA: (all the species.)
BORONIA: (all the genera.)
BOSSIÆA: (all the genera.)
BOUVARDIA.
Triphylla, *et varieties.*
BRUNIA.
Nodiflora.
Alopecuroides.
Plumosa.
Superba.
Formosa.
Ciliata.
Cornosa.
Paleacea.
Ericoides.
BUBON, Galbanum.
BURCHILLIA, Capensis.
CALCEOLARIA: (all the species.)
CACALIA.
Repens.
Articulata.
Tomentosa.
CALLISTACHYS: (all the genera.)
CALLISTEMON: (*as in Conservatory List.*)
CALOTHAMNUS.
Villosus.
Clavatus.
Quadrifidus.
CAMELLIA: (all the genera, with var.)
CARMECHÆLIA, Australis.
CAMPANULA.
Gracilis.
Stricta.
Littoralis.
Quadrifida.
Aurea.
Cernua.
Mollis.
Saxatilis.
Laciniata.
CHIRONIA.
Deccusata.
Frutescens.
Linoides.
Angustifolia.
Baccifera.
Lychnoides.
CHENOLIA, Diffusa.
CHORIZEMA.
Nana.
Ilicifolia.
Henchmanii.
CINERARIA.
Geifolia.
Canescens.
Aurita.
Lunata.
Hybrida.
Elatior.
Cruenta.
Pulchilla.
Populifolia.
Lobata.
Præcox.
Linifolia.
Humifusa.
CISTUS: (all the tender species.)
COLLETIA, Seratifolia.
CORONILLA.
Glauca.
Juncea.
Argentea.
Viminalis.
CORRÆA: (all the genera.)
CRASSULA.
Orbicularis.
Rosularis.
Cotyledon.
Cordata.
Pellucida.
Perfilata.
Imbricata.
Columnaris.
Ramuliflora.
Concinna.
Ligulifolia.
Obliqua.
Arborescens.
Ramosa.
CRINUM: (several species.)
CYCAS, Revoluta.

CYCLAMEN.
Persicum, *et varieties.*
CROWEA, Saligna.
CYCLOPIA.
Genistoides.
Elata.
Ternata.
Triphylla.
CYRTANTHUS: (all the species.)
DAPHNE, Odora.
DAVIESIA: (all the species.)
DILLWYNIA: (all the species.)
DIONÆCA, Muscipula.
DIOSMA: (all the species.)
DICHONDRA, Sericia.
DIGITALIS, Sceptrum.
DISANDRIA, Prosterata.
DORYANTHUS, Excelsa.
DRYANDRIA: (all the genera.)
ECHEUM: (all the tender species.)
ELICHRYSUM: (all the genus.)
ERODIUM.
Incarnatum.
Hirtum.
Crassifolium.
EPACRIS: (all the genus.)
ERICA is a genus so popular, it would be vain to make a selection. Where there is any attempt at collection there should not be less than from 200 to 300 species of this family.
ERYTHRINA.
Crista-galli.
Laurifolia.
EUPHORBIA.
Caput-Medusæ.
Mellifera.
EUCHILUS, Obcordata.
EUTAXIA, Myrtifolia.
EXACUM, Viscosam.
FALKIA, Repens.
FABRICIA: (*as in Conservatory List.*)
FUCHSIA: (*as in Conservatory List.*)
GARDENIA.
Florida.
Radicans.
GLADIOLUS: (many species.)
GLOXINIA.
Speciosa.
Macculata.
GNAPHALIUM: (all the genus.)
GOMPHOLOBIUM: (all the genus.)
GOODIA: (all the genus.)
GORTERIA: (all the genus.)
GREVILLEA: (*as in Conservatory List.*)
HAKIA: (*as in Conservatory List.*)
HALLERIA, Lucida.
HELIOTROPIUM.
Peruvianum.
Corymbosum.
HERMANNIA: (several species.)
HIBISCUS.
Scaber.
Hetrophyllus.
Incanus.
Speciosus.
Grandiflorus.
Hispidus.
Richardsoni.
Patersonii.
HOAREA: (many species.)
HOVEA: (all the genus.)
HUMEA, Elegans.
HYDRANGEA, Hortensis.
HYPERICUM: (all the tender species.)
ILLICIUM: (*as in Conservatory List.*)
INDIGOFERA.
Filifolia.
Sericia.
Candicans.
Amœna.
Stipularis.
Denudata.
Cytisoides.
Frutescens.
Australis.
ISOTOMA, Axilaris.
IXODIA, Achellioides.
JACKSONIA, Scoparia.
ISOPOGON.
Formosus.
Anemonefolius.
Longifolius.
Trilobus.
Teretifolius.
IXIA: (many species.)
JACARANDIA, Mimosifolia.
LAGERSTRÆMIA, Indica.

LACHENALIA.
- Tricolor.
- Punctata.
- Flava.
- Pendula.

LAMBERTIA.
- Formosa.
- Echinata.

LAURUS.
- Borbonia.
- Glauca.
- Camphora.

LECHENAULLIA, Formosa.

LASIOPETALUM: (*as in Conservatory List.*)

LEPTOSPERMUM: (*as in Conservatory List.*)

LEUCADENDRON, Argenteum.

LOBELIA.
- Unidentata.
- Pinifolia.
- Bellidifolia.
- Campanuloides.
- Ilicifolia.
- Pubescens.
- Lutea.
- Coronopifolia.

LODDIGESIA, Oxalidifolia.

LOTUS, Jacobea.

MAGNOLIA.
- Pumila.
- Fuscata.
- Annonafolia.

MAHERNIA.
- Incisa.
- Diffusa.
- Burchellii.

MALVA.
- Scabra.
- Capensis.
- Elegans.
- Grossularifolia.

MASSONIA: (many species.)

MELALEUCA: (*as in Conservatory List.*)

MESEMBRYANTHEMUM: (most of the genus.)

METROSIDEROS: (*as in Conservatory List.*)

MIMULUS, Glutinosa.

MELIANTHUS.
- Major.
- Minor.

MYRTUS, Communis.

MYOPORUM: (all the genus.)

NERIUM.
- Oliander.
- Splendens.

NANDINA, Domestica.

ŒDERA, Prolifera.

ONONIS.
- Glabra.
- Natrix.
- Crispa.

OSTEOSPERMUM, Grandiflorum.

OXALIS: (many species.)

OXYLOBIUM, Cordifolium.

PAVONIA, Præmorsa.

PASSERINA.
- Laxa.
- Filiformis.
- Grandiflora.
- Spicata.
- Ciliata.

PENÆA.
- Marginata.
- Squamosa.
- Mucronata.

PIMELEA: (all the genus.)

PHYLICA: (several species.)

PITTOSPORUM: (*as in Conservatory List.*)

PLATYLOBIUM: (all the genus.)

POLYGALA: (all the genus.)

PULTENÆA: (all the genus.)

PODOLOBIUM: (all the genus.)

PRIMULA, Prænitens.

PROSTANTHERA.
- Lasianthos.
- Violacea.

PROTEA: (many species.)

RAFNIA.
- Amplexicaulis.
- Elliptica.
- Cunifolia.
- Triflora.
- Opposita.

ROELLIA, Ciliata.

RUTA, Albiflora.

SALVIA.
- Coccinia.
- Pulchilla.
- Colorata.

SCHOTIA.
- Speciosa.
- Tamarindifolia.

SCOTTIA, Dentata.

SELAGO.
- Corombosa.
- Spicata.

SEMPERVIVIUM.
- Arboreum.
- Tabulæforme.

SOPHORA: (several species.)

SPARMANNIA, Africana.

SPARTIUM.
- Monospermum.
- Sphærocarpum.

SPHÆROLOBIUM.
- Vimineum.
- Medium.

STAAVIA.
- Radiata
- Glutinosa.

SOLANUM.
- Laciniatum.
- Quercifolia.
- Marginata.

SOWERBEA, Juncea.

SPIELMANNIA, Africana.

TAXUS, Nucifera.

TEMPELTONIA.
- Retusa.
- Glauca.

THOMASIA. See *Lasiopetalum*.

TELOPEA, Speciosissima.

TREVIRANIA, Coccinia.

TRISTINIA, Neriifolia.

TROPÆOLUM.
- Minus, *flora pleno*.
- Majus, *flora pleno*.
- Hybridum.
- Pinnatum.

VERONICA, Perfoliata.

VIMINARIA, Denudata.

VERBENA.
- Aubletia.
- Lambertii.

WESTRINGA, Rosmarinifolia.

ZIERIA, Smithii.

GREEN-HOUSE AND CONSERVATORY CLIMBERS.

ARISTOLOCHIA.
- Glauca.
- Sempervirens.
- Rotunda.
- Hirta.

ASPARAGUS.
- Retrofractus.
- Capensis.
- Scandens.

BIGNONIA, Capreolata.

BILLARDIERA: (all the genus.)

BRACHYSEMA.
- Latifolia.
- Undulata.

CLEMATIS.
- Coriacea.
- Aristata.
- Hedysarefolia.
- Brachiata.

CISSUS.
- Antarctica.
- Capensis.

Pentaphylla.
Quinata.
COBÆA, Scandens.
DOLICHOS.
Hirsutus.
Lignosus.
Capensis.
EUSTREPHUS.
Latifolius.
Angustifolius.
GLYCINE.
Secunda.
Bituminosa.
Angustifolia.
Hetrophylla.
GELSEMIUM, Sempervirens.
HOYA, Carinosa.
HIBBERTIA.
Grossalariæfolia.
Volubilis.
Dentata.
IPOMEA.
Sinuata.
Pendula.
Carolina.
JASMINUM.
Gracile.
Acuminatum.
Azoricum.
Grandiflorum.
Odoratissimum.
KENNEDIA: (all the genus.)
MIKANIA, Scandens.
MAURANDIA.
Semperflorans.
Antirrhiniflora.
Barkleyana.
PASSIFLORA.
Lutea.
Maculata.
Cœrulia-racimosa.
Alato-Cœrulia.
Edulis.
Chinensis.
Filementosa.
Herbertiana.
Adiantifolia.
RUBUS, Moluccanus.
RUSCUS.
Androgynus.
Reticulatus.
Volubilis.
SMILAX, Australis.
TESTUDINARIA, Elephantipes.

In offering the Systematic Catologues, both of Fruits and Flowers, we do not mean to advise collections to be exclusively formed from them, as many valuable fruits are yearly coming into notice; and however favorable circumstances may have been to bring a vast number of sorts under our observation, there are some that we have never seen, and many that are not definitely settled as to name, &c., of which we could give no correct description. As far as the nature of the case would admit, we have described no fruit, nor enumerated any plant, which we have not seen in some state or other. In reference to the Catalogue of Conservatory Plants, it is entirely formed of such plants as we have either cultivated or seen cultivated with success; and the plants in the Green-house List are such as, according to our view of the case, would form a very complete collection where a display of bloom is more a desideratum than a full botanical enumeration, when the number of species are generally more appreciated than an abundance of flowers, or diversity of foliage.

INDEX.

GENERAL MANAGEMENT

OF THE

STOVE DEPARTMENT.

INTRODUCTION.

THE plant-stove is a department in horticulture, dedicated to the cultivation of such plants as are natives of tropical or warm climates, and which will not prosper in any of the other plant structures noticed in a former part of this work. The degree of temperature suitable for those plants which enter into this department is necessarily very high, varying from a minimum of 60, to 90 degrees or upwards, of Fahrenheit, as a maximum.

Stoves are much less numerous in the British gardens than other plant structures, and consequently the management of them is generally much less understood. The expense attending them is the most probable cause of their limited number, and certainly not any want of interest or splendour in the plants or their flowers. To this division, in fact, belongs most of the splendid flowering, eccentric, and curious plants, and indeed those which supply us with some of our most valuable spices, vegetable medicines, oils, gums, and dyes; including many which we are only acquainted with as far as their history is connected with the arts or sciences, or by particularities related of them by travellers. A portion of them supply a numerous part of mankind with food who are yet in a state of natural simplicity, and many of them constitute a considerable part of the importations of this country, and thence become beneficial, not only as a lucrative reward to the speculator, but also as diffusing comfort and sustenance to a large portion of the community. Coffee, sugar, cocoa, sago, and chocolate, may be enumerated, amongst many others, as constituting a useful part of our daily food; and Jesuit's-bark, cinnamon, ipecacuanha, balsam of capivi, cassia, and gum-

arabic, may be mentioned as valuable medicines; as also *Quassia Amara*, the bitter of porter, so much used in the making of that liquor. Connected with the useful arts, we may notice lance-wood, mahogany, log-wood, cotton-tree, and Indian-rubber; and, as vegetable curiosities, may be noticed the air-plants, arborescent ferns, and that most extraordinary of all parasitics, *Rafflesia Arnoldi*, discovered in 1818, in a jingle in Sumatra, by Dr. Arnold, and jointly named after him and the late Sir Stamford Raffles; the following description of which is to be found in the Transactions of the Linnæan Society:—"The plant consists of the flower only, having neither leaves, branches, nor roots; the flower is a yard across; the petals, which are subrotund, being twelve inches from the base to the apex, and it being about a foot from the insertion of the one petal to the opposite one; the petals are from a fourth to three-fourths of an inch thick, and the nectarium, it is supposed, would hold twelve pints. It appears to take its origin in some crack or hollow of the stem, and soon shows itself in the form of a round knob, which, when cut through, exhibits the infant flower, enveloped in numerous bracteal sheaths, which successively open and wither away as the flower enlarges."

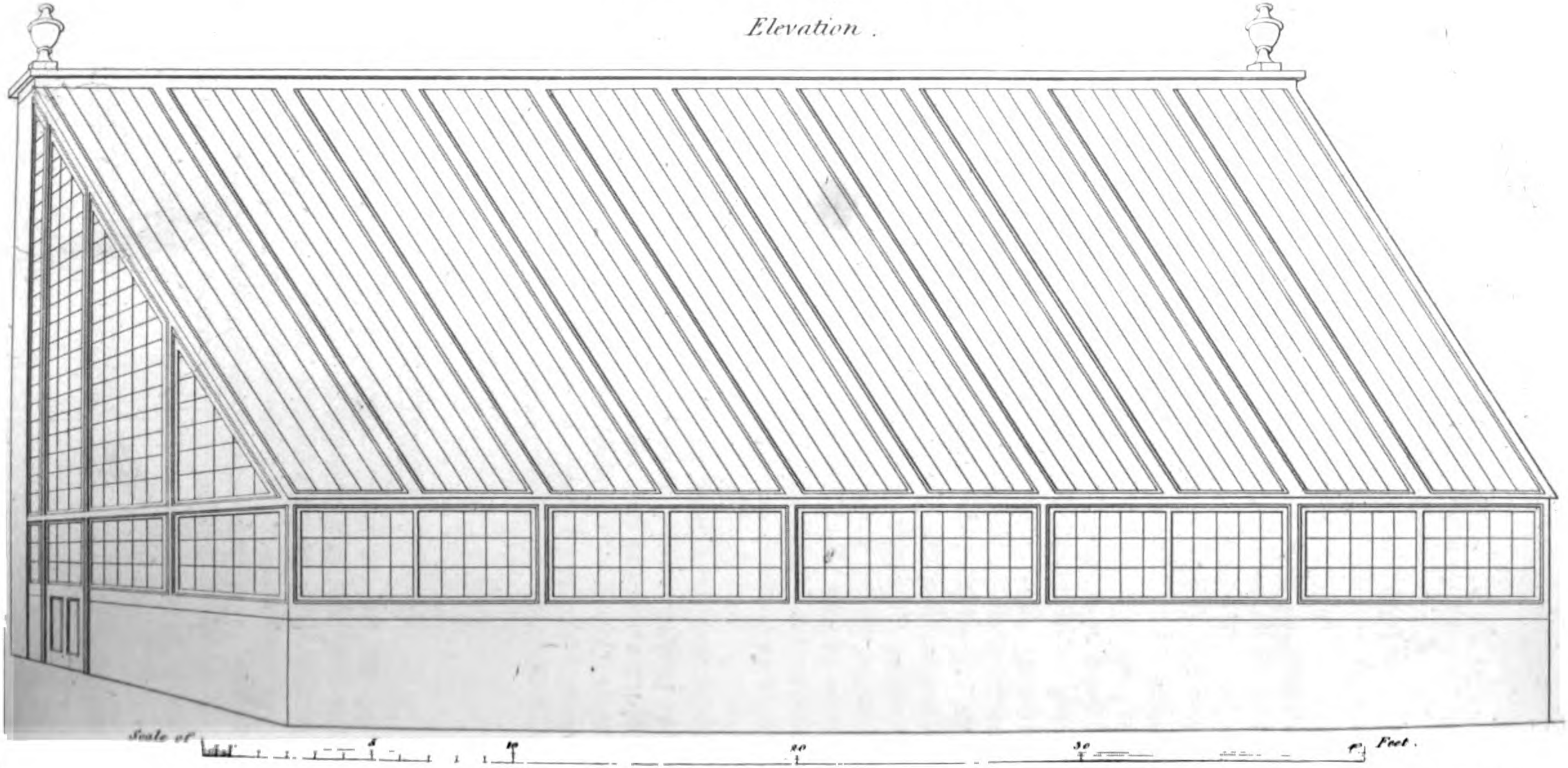
Stoves may be considered as of two kinds: the humid or bark-stove, and the succulent or dry-stove. In the former are cultivated all plants that require a moist, and at the same time a high temperature, while in the latter are cultivated those which can live long without water in a high temperature; and these are for the most part succulent plants, as *Cactus*, *Euphorbia*, *Aloe*, &c.

CONSTRUCTION OF THE BARK-STOVE.

In the construction of a stove-house, calculated for the cultivation of tropical plants, much depends upon the taste and object of the owner. Some cultivators prefer small plants, and limited or select collections, whilst others affect large specimens and extensive collections. In the former case, a stove may be constructed to answer every purpose of the owner, differing little from that of the pine-house in common use, but

Plant Stove at Claremont.

Elevation.



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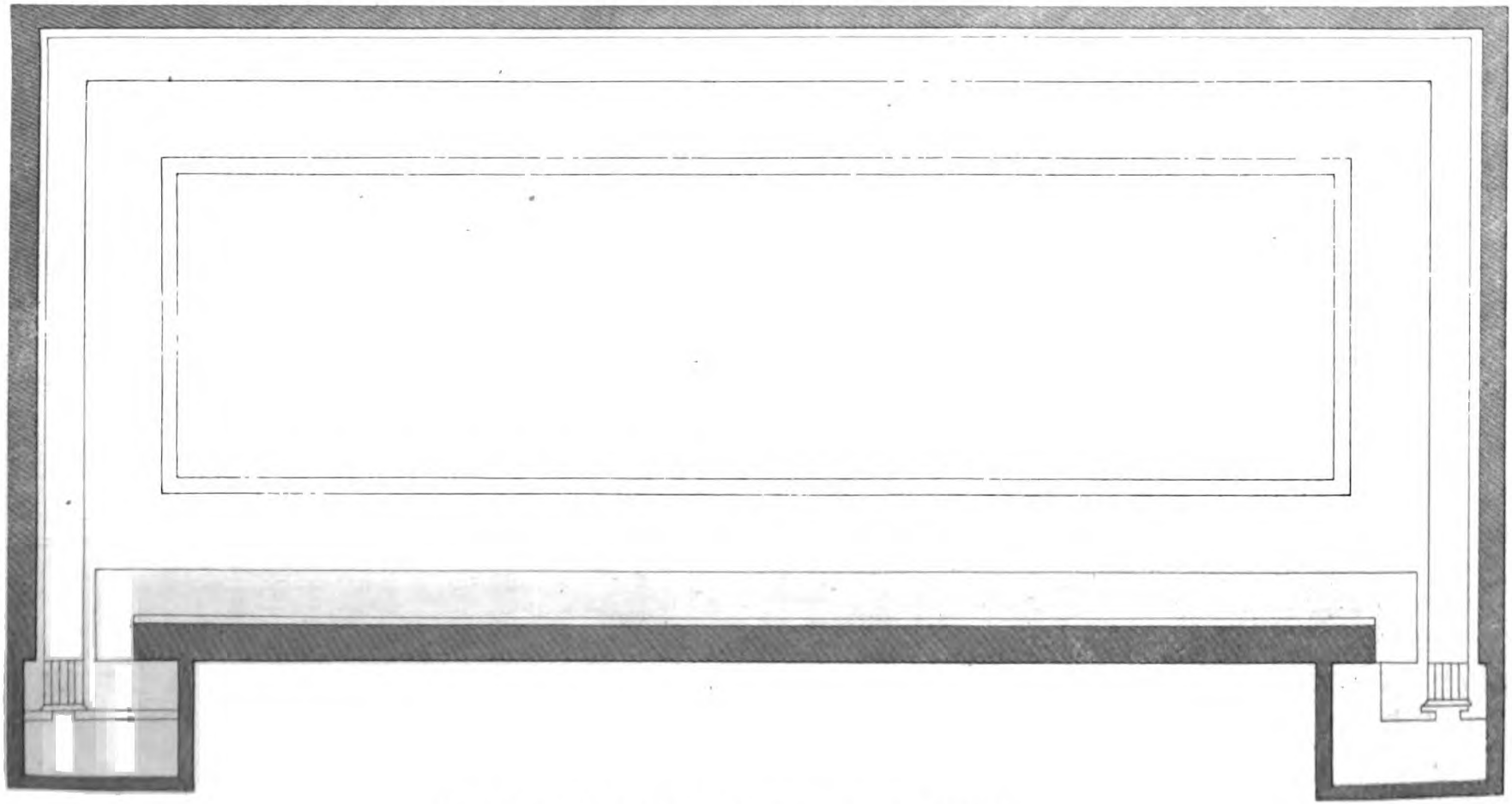
E. Turrell sc.

Plan Five

Ground Plan.



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A. Purcell sc

of course loftier; and as the plants in a stove are, or ought to be, at all times seen to the greatest advantage, they should stand on a bed in the middle of the house, having a passage sufficiently broad all round it. The accompanying plates represent the elevation and ground-plan of one of the plant-stoves at Claremont, the country-seat of H. R. H. Prince Leopold of Saxe-Cobourg Saalfeld, in which are cultivated plants which do not attain a great size, or such as it is desirable to have in flower while in a young state. Such also are the stoves at Bury-Hill and Bayswater, in which tropical plants have long been successfully cultivated by their respective superintendents. In those cases where the fancy of the proprietor leads him to have large specimens of the more lofty growing kinds of plants, such as palms, *Musas*, &c., houses of more capacious dimensions are required; and on that head we may refer to the large palm-stove of Messrs. Loddige, or the still more magnificent tropical-house of Mrs. Beaumont, at Britton-Hall in Yorkshire. The interior of the former is one of the greatest treats the lover of plants can be indulged with in the vicinity of London, and reflects the greatest credit on the very spirited proprietors. The exterior, however, is deficient in taste and elegance. The latter is an immense dome, and possesses all that degree of elegance for which such houses are supposed to be so eminently distinguished. The plants which enter into such houses, are so exceedingly rapid in their growth, and attain so enormous a bulk, that no house hitherto built in this country has been found sufficiently large for them, in which they can develope their true characters. Plant-stoves require the highest degree of temperature of all other horticultural erections, and consequently many opinions have been pronounced on the means of producing that temperature upon the best and most economical principle. Steam-pipes, in conjunction with flues, and sometimes by themselves, have been tried, and steam has been applied under the bed upon which the plants stand; which, by passing through a stratum of coal-ashes, tan, or similar matter, heated the atmosphere of the house, while at the same time it rendered the bed upon which the plants either stood on, or were plunged in, sufficiently warm. Formerly, as a greater degree of bottom-heat was used in the cultivation of tro-

pical plants than is now used for the cultivation of pines, we then found the pots plunged into beds of fermenting tanners' bark; but latterly, however, this method is almost abandoned, and we find stove-plants now almost universally cultivated without much bottom-heat, at least with no more than they receive from the atmosphere of the house. A bed of prepared coal-ashes, rendered perfectly porous beneath, to admit of all superfluous water passing off, is now used, on which the plants are set; and it is only in particular cases that we now find them plunged in a bottom-heat.

Upon this subject, Mr. Sweet, a botanical cultivator of the first eminence, offers the following remarks:—"Some hot dung or tan may be still kept in the pit to throw up a little warmth, on which should be put a good thickness of sand or gravel for the pots to stand on, and the plants will thrive much better than if plunged in tan: it is also coming nearer to nature, which should be always studied in the cultivation of plants, both in soil and situation. In tropical countries it is the sun that heats the earth in which the plants grow, not the earth that heats the air; and the heat must be kept up in the stoves accordingly. If the house be heated by steam, no tan is required. The plants may be set on stages, or any way that is most convenient. Some of them may be planted out in the house, where they will grow in great perfection, and flower and ripen fruit; but if grown in large pots, they will answer quite as well."

In the construction of plant-stoves, it may be necessary to notice, that fewer openings for the admission of air are required than in any of the other plant-houses, for this reason, that the degree of heat, which must be always kept up within the enclosed atmosphere, is so much greater than that of the open air, that the difference of the specific gravity of the two fluids, when permitted to mingle by opening two or three sashes, produces a more active circulation, and sooner approaches to an equilibrium of temperature; and, however numerous the openings in the roof or sides of such houses may be, they can seldom be made use of without reducing the house to too low a temperature; and as the plants are for the most part kept in pots, and many of them being of slow growth, they are not

so apt to etiolate, or become drawn up slender, as those in the green-house or conservatory.

As there are many of the tropical plants in general cultivation that are climbers, and amongst them some of exceedingly great beauty, it is necessary that they be accommodated with proper means of supporting themselves. The most usual means are training them up the rafters, and some houses are furnished with wire trellises, as is the case with the house we have adopted for our plate. These trellises may be so arranged as to add considerably to the beauty of the house, when properly covered with plants, and so disposed as to form arches over the footpaths, and, occasionally, from one of the pillars which may support the roof of the house to another. However, too much scope should not be given to climbing-plants, however beautiful they may be, for, if carried to an extreme, it would occasion too much shade for the plants which occupy the middle of the house. The bed on which the plants are intended to stand, should be surrounded by a neat parapet wall, only a few inches higher than the surface on which the plants are to stand, serving to divide the bed from the walk or footpath, which should, as has been already observed, be made to surround the whole. If the house be to be heated by smoke-flues, they should be placed between the footpath and the walls of the house, so that any scorching heat may be prevented, as much as possible, from coming in too close contact with the foliage; a circumstance which often happens, and cannot be too securely guarded against. The house, of which our drawing is a representation, has two fires, which for its size are found sufficient. One of the flues enters at one end, and having passed along the front and ends, discharges its smoke in the back wall at the end farthest from the furnace. The other flue enters at the other end of the house, and makes three returns along the back wall, and discharges its smoke at the end farthest from its furnace. Spaces are left about a foot high between each flue, and they are all separated from the back wall by a vacuity of two inches, so as to present as much surface as possible for the escape of the heat. Upon the top of the third back flue, succulent plants are placed, and over the front one is placed a neat trellis, on which such plants are

placed that are not liable to be injured by the heated air. Often in winter, when the fires are kept up very strong, and powerful steaming resorted to, in order to counteract the effects of strong fire-heat, these plants are removed for a considerable distance from the end where the heat enters, and are disposed of in other parts of the house. The front parapet is found a convenient situation for placing small or handsome specimens while in flower, as they are there seen to greater advantage than when mixed in the general collection. In regard to plant-stoves heated by hot water, the pipes may either be placed exactly as the flues above described, as they occupy little space, or they may be placed under the footpaths, and covered with a neat ornamental grating of cast-iron. In placing hot water pipes under the foot-paths, accommodation can better be found for the reservoirs, than if placed above the floor-level. We have repeatedly expressed our opinion favorably to the hot-water system, and for the culture of stove-plants consider it of the utmost importance. In the cultivation of tropical plants, it does not often occur that they are planted out in the conservatory manner, as the rapidity of their growth, and the great size to which many of them attain, render this mode of culture unnecessary. The larger growing species are much better cultivated in large pots or tubs, and in these, specimens may be grown to a height sufficient for any house which has been yet erected in this country. The climbing species may, however, be planted out, as from their habits they can always be kept within due bounds by the pruning-knife, and seldom succeed well if not in very large pots, which may not be always conveniently disposed of in situations where they should stand. Although the majority of stove-plants are better cultivated in pots or tubs, than when planted out, it must be still acknowledged that the pots have not always the most agreeable appearance. In order to remedy this defect, without plunging them in the bed, which we would not advise, unless in cases of the most robust growing kinds, whose roots can sustain no injury by this mode of treatment, we would suggest the idea of covering them with moss, which may be always kept fresh by occasionally renewing it; but even this is not often necessary, as the humidity which a well-managed bark or moist

stove attains by daily watering, will be suitable to several species of that class of plants. Almost all mosses fit for this purpose prefer a damp shady situation; and it is surprising to see how luxuriantly some of them, that are natives of the regions of almost perpetual snow, will flourish in a moist stove, where the temperature is seldom below 60 degrees. Towards the front, where the sun has most influence, various species of *Cenomyce*, particularly *C. rangiferina*, will retain its natural colour for a long time, and form a beautiful contrast with the darker hues of those that are behind. Stove-plants require a great portion of water, and during winter much trouble and inconvenience will be occasioned, if provision be not made for having a supply of that indispensable element conveniently at hand; and as the water with which they are at all times to be supplied should be nearly equal to the minimum temperature of the house, a cistern should be so contrived as to have in it at all times an abundant supply. The most eligible situation for such a cistern, we presume, is over the furnace, in the shed behind, which should be supplied by a pipe from the reservoirs appended to the garden. Cisterns for this purpose may be of lead or cast-iron, as being always supplied with water accordingly as it is drawn off for use, cannot be injured if they be made of either material. A pipe with a stop-cock should be introduced from the cistern into the house, so that the cultivator may be supplied with the greater convenience; and as the fires are seldom extinguished during cold weather, a sufficient supply of warm water can be always readily obtained.

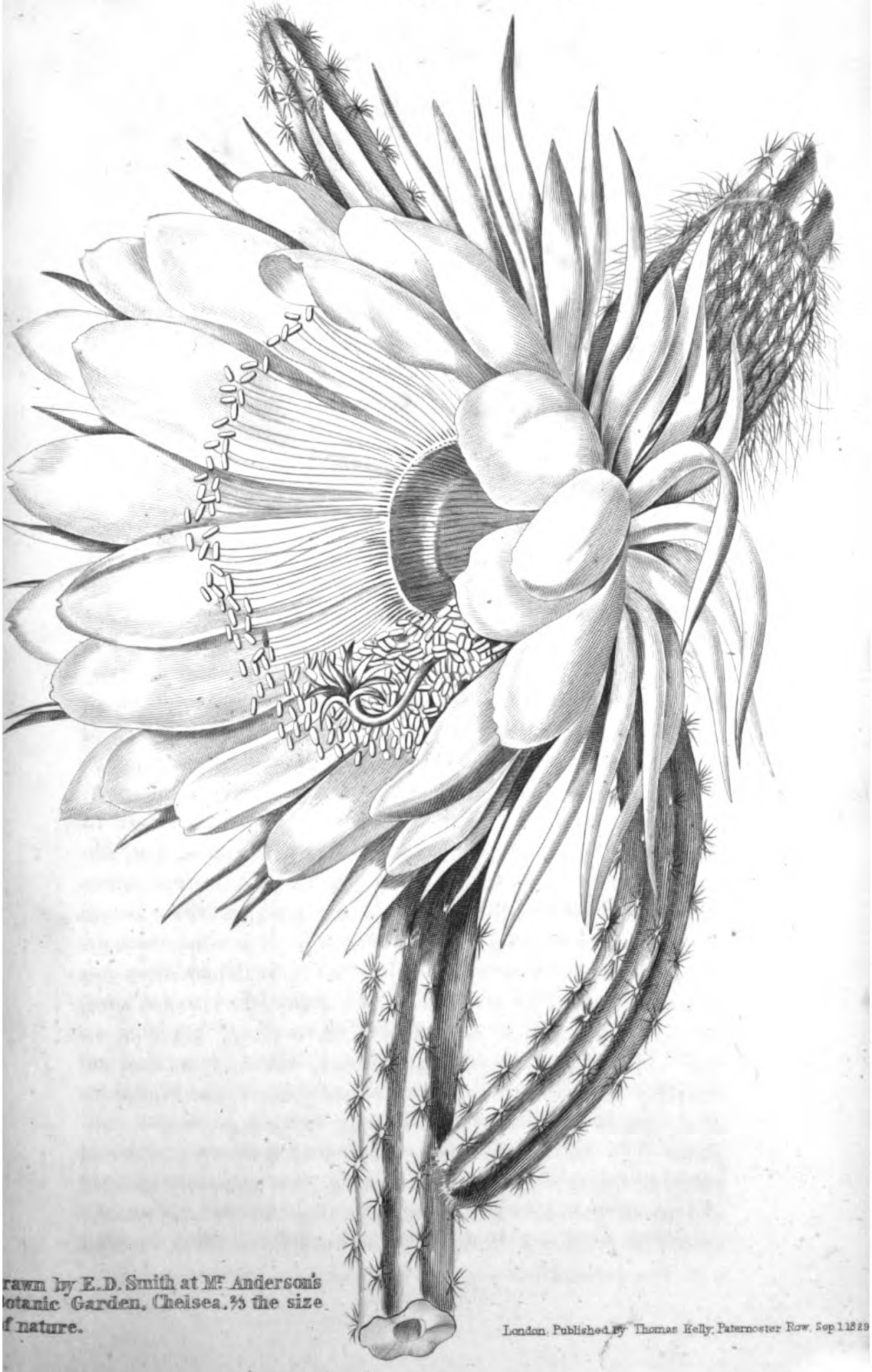
CONSTRUCTION OF THE DRY-STOVE.

In the construction of the dry stove, it is not essentially necessary that it be different from that which has been already described for the cultivation of moist-stove plants, further than that, instead of the bed on which the plants are placed in the latter, a stage be substituted in the former for their reception. The plants which form the great bulk of dry-stove collections are succulents, and many of them exceedingly slow in growth, some not attaining a greater height in a century than that of many moist-stove plants in the period of a month. Being

placed on stages, their characters are better exhibited to the spectator then if placed on a flat surface. It is not in character with the inhabitants of this structure to have creepers trained upon the rafters, for plants of so very opposite habits do not associate well together; and besides having an inharmonious effect, they produce another, which is injurious to their welfare. All tropical succulent plants are found naturally exposed to the full influence of the sun, and when imported into our northern latitudes, require all the sun-shine which we can admit to them, and this can never be fully admitted, if the foliage of creepers be allowed to intervene between them and the light.

The great merits, generally considered, of dry-stove plants are their eccentricity of forms, although some of them, particularly the *Cactus* genus, produce flowers, one of which, *C. speciosissima*, baffles the ingenuity of the most expert artist to imitate it, in respect to delicacy and richness of colouring. Many others are splendid while in bloom, but, for the most part, are very fugacious, seldom lasting many hours in perfection. The *C. Grandiflorus*, of which the annexed figure is an excellent reduced representation, has long been an inmate of our stoves and attracted notoriety, in consequence of its flowering during the night, and hence its English name, Night-flower of Cerrus or *Cactus*. The flower of this curious species begins to expand its bloom about eight o'clock in the evening, and is in perfection from ten to twelve, but, before day-light next morning, is fled for ever. The finest collection of this division of plants in this country is in the Royal Botanic Garden at Kew, where a large house is dedicated for their reception, and the mode in which they are cultivated reflects great credit on Mr. Bigby, the curator, who, for many years, has paid more than ordinary attention to their cultivation. There are, however, many plants that are correctly dry-stove plants, which are not of the succulent sorts, consisting of climbing, bulbous, herbaceous, and woody plants. In order to cultivate a complete collection of these plants in the first degree of excellence, it is necessary to have a separate division for each section, but this is seldom observed in practice; the majority of cultivators being content with two general houses, one especially for bark-stove plants,

CACTUS GRANDIFLORA.



rawn by E.D. Smith at Mr Anderson's
otanic Garden, Chelsea. ⅔ the size
f nature.

London. Published by Thomas Kelly. Paternoster Row. Sep 1 1829

and the other for dry-stove plants; consequently, part of both divisions are not at all times properly treated, unless the cultivator be at much trouble in altering the mode of culture of certain species to suit existing circumstances. Dry-stove plants generally require an intermediate temperature between the green-house and bark-stove, and a much drier atmosphere than either, particularly the latter: they require always a great degree of light, and should consequently be kept near to the glass. Those which are succulents, require very little water, particularly during winter, and in all cases more harm may be expected from a too free application of that element, than an almost entire want of it.

STOVE AQUARIUM.

The great bulk of cultivated aquatics are either hardy, and capable of being cultivated in the open air, or they are so tender as to require the same temperature as stove or tropical plants. There are fewer examples of this kind of plant structures in this country, than of the other descriptions of houses already noticed, not but that they are very interesting in their way, and many of the plants which might be cultivated in them are extremely curious, beautiful, and interesting. The genus *Nymphæa* is exceedingly beautiful, and those of *Euryale*, *Nelumbium*, and many others, extremely curious, and that of *Oryza* and *Papyrus* highly interesting; the former being the rice of commerce, and the latter the well-known *papyrus* of the ancients, the plant which furnished the materials on which the most ancient of all records were written, and to which we are indebted for our knowledge of events coeval with the great Jewish legislator. As examples of Tropical Aquariums, we may refer to those in the gardens of the Duke of Marlborough at White Knights, in which were cultivated for a considerable time a rich collection of these plants, but which, from causes of a private nature, is now discontinued. One of these houses may be described as being a span-roofed house, having the sides and ends also of glass as low as the top of the flues. Instead of the bed, or stage, in the other stoves, a large cistern is here substituted, having a walk round it.

In this cistern are cultivated the proper plants, some rooting in muddy rich soil placed on purpose in the bottom; others floating on the surface, which, like the genus *Lemna*, may be said to have no settled place of abode. A flue goes round underneath the bottom of the cistern, in order to keep the water of a certain temperature; while another flue goes round the house, for the purpose of heating the atmosphere of it: the bottom of the cistern in question is of slate, supported on iron bearers, over which is a covering of lead. Wood might have been used, had no fear of danger from the heat of the flues been apprehended. In a house of this description, the tallest growing aquatic plants might be exceedingly well cultivated; but for those of diminutive growth, and such as float only on the surface of the water, such as *Nymphæa*, &c., a house much less lofty, or indeed a neat pit would answer much better, for experience proves, that such plants require all the light and sun that it is possible to give them, and which can never be so completely effected if they be placed too far from the glass. Mr. Loudon, in *The Encyclopedia of Gardening*, proposes the following improvements in regard to Tropical Aquariums:—"A more perfect plan would be (alluding to the house at White Knights) to have the cistern close to the front glass, and to have that glass rather flat, say an angle of 15 degrees; or two cisterns might be formed, one in the back part of the house for tall plants, and the other in front for floating foliage, with a broad path between. But the most elegant plan would be," continues that intelligent writer, "to have a circular house, glass on all sides, to have a cistern in the centre for river plants, and a surrounding cistern for those which grow in stagnant water. To imitate the effect of the motion of water, in the central cistern, the mould, or pots in which the plants grow, might be placed on a bottom apart from that of the cistern, and this bottom being on the end of an upright shaft might, by the aid of proper machinery, in a vault below, be kept in perpetual circular motion. Those plants, which grow naturally in rapid streams, might be planted or placed on the circumference of the bottom, and those requiring less agitation towards its centre. If reversed motion were required to imitate tides,

(where marine aquatics were cultivated,) nothing could be easier than by the sort of wheel used in the patent mangle to produce it to any extent; or, by another still more simple plan, known to every engineer, it might be changed seldomer, say only once or twice in twenty-four hours. If a rapid and tortuous motion were required, then let the bottom on which the plants are placed be furnished with small circular wheels placed on its margin, working on pivots, and furnished on their edges with teeth like a spur-wheel. Then let there be a corresponding row of teeth fixed to the inside of the wall, or side of the cistern, into which they are to work like a wheel and pinion.

"By this means, pots of plants, set on the small wheels, will have a compound motion; one round the centre of the small wheels, and another round that of the large bottom. It may be thought by some, that the machinery would be intricate and troublesome, but the power requisite is so very small, that it might easily be obtained by machinery on the principle of the wind-up jack, such as was used by Deacon in his ventilating Æolians. This kind of machinery very seldom goes out of order, or requires repair, and no other attention would be necessary than being wound up twice in twenty-four hours, and oiled occasionally. The same vault that contained it might serve for the furnace or boiler," if heated by steam.

PROPAGATION OF TROPICAL PLANTS.

Propagation is the first principle which should be acted upon in the formation of a collection of plants, and a strict attention to it annually is no less important after the collection is established, for the lives of plants are as uncertain as those of animals; and unless attention be paid to keeping up the stock by repeated propagation, many of the short-lived species will soon be lost. To keep up a collection in the first degree of excellence, it is necessary that a certain number of each species be annually propagated, as many of them become unsightly when old, and by increasing in size preclude the possibility of keeping so many individually. Some tropical plants, however, do not flower until they attain a considerable

size and certain age; but this is not generally the case, the majority will flower finer, and look much better, when about two or three years old than when kept longer. Small plants are more conveniently kept than large ones, and, by having a young stock always in readiness, there is little chance of losing any of the species.

Stove-plants, like most other plants, are propagated by a variety of methods, but are more often originated by seeds and cuttings than by any other. Few of them ripen their seeds in this country, but there is no difficulty in obtaining them from abroad, as the intercourse between this country and the East and West Indies, the Cape of Good Hope, and the islands in the South Seas, is so frequent. Many seeds introduced lose their vegetative principle from a variety of causes, and hence the frequent disappointments which occur to the cultivator. When seeds are not thoroughly ripened before they are gathered, or when they are packed up before properly dried, or when they are injured by the effects of moisture during the voyage, may be considered as some of the causes. To remedy these defects has occupied the attention of several eminent botanists; but the conclusions that they have hitherto drawn, do not appear to be completely satisfactory. Unripe seeds seldom germinate, because their parts are not yet prepared to form the chemical combinations on which germination depends. Some seeds retain their vegetative properties for many years, while others even commence vegetating before they quit the very seed-vessel; and, in the case of some fruits, it occurs even before the fruit is ripe, and while yet attached to the parent plant. Some others, if guarded from the effects of external air, will retain their living principle, from forty to probably one hundred years. Seeds of oats have been ascertained to have remained during the former period in a sound state, and have freely vegetated when the ground on which they were deposited was ploughed up. From the experiments of Ray and others, we learn that seeds will not vegetate if placed in a vacuum, but that the same seeds will grow when air is again admitted to them.

The enterprising Baron Humboldt found that the process of vegetation was accelerated by steeping seeds in water im-

pregnated with oxymuriatic acid, and this has been tried in the Clapton Nursery, in regard to accelerating the vegetation of the seeds of *Banksias*, and other New Holland seeds, that do not vegetate freely. There are other gases which have a different effect, namely, nitrogen gas, carbonic acid gas, and hydrogen gas, which, according the experiments of Archard, prevent the germination of seeds, unless mixed with a certain proportion of oxygen gas, which led him to conclude that the latter gas is necessary to the vegetation of seeds, and the only constituent part of the atmospheric air which is absolutely necessary for that process.

No seed will germinate at or below the freezing point, although placed in their proper soil, and hence seeds do not spring during winter. Heat and moisture are the principal agents for producing this effect, and whenever these are supplied, as a consequence, atmospheric air accompanies them.

As there is much difficulty in procuring seeds of some species from India in a state fit for vegetation, no time should be therefore lost in sowing them upon their arrival. The late Cushing, in regard to the season for sowing tropical seeds, observes, "As the spring is undoubtedly the best time for sowing, a few weeks delay may, in some instances, be advisable. If received late in October or November, wait till January, or perhaps February, unless it evidently appears that they will not keep out of the earth so long a time in a vegetative state. Those which can be sown before August, have a good chance to acquire sufficient strength of growth to carry them through the winter-months, so adverse to the general efforts of young vegetable life." On preparing the pots, mould, &c., and sowing the seeds, the same author continues:—"The pots being well drained, should be filled with the compost suitable to the species of plant of which the seed intended to be sown has been produced: let it be pressed down to about a third, or half an inch, below the rim, according to the size of the seeds; if they be small or light sorts, it will be necessary to press it pretty tight, and to add a little very fine sifted mould, on which to deposit the seeds, previously smoothing it with a bit of thin flat wood, bent so as to lie on it level. Being thus prepared, let the seed be sown regularly

on the surface, and cover it from about an eighth to a quarter of an inch, according to the size of the seed, as before, with the same sort of fine mould. But, if the seeds be of the largest sorts, as, for instance, the nut or stone kind, no more is necessary than to press them into the earth with the finger, and to cover somewhat thicker than is recommended for the others. In either case, the covering should be pressed moderately on the seed with the hand, which is indeed a most necessary caution in sowing seeds of any description whatever. In order to insure the vegetation of hard or very tough shelled seeds, some have them soaked in water for a few days, say a week, or even ten days, for those which happen to be very dry, previously to sowing: a shallow pan, placed on the coolest part of the flue in the propagating-house, is the readiest and safest article to receive them for this purpose; they should be examined daily, and sown the moment any swelling or growth appears; this process, however, is fraught with danger to many of the lighter and smaller sorts. The sowing being finished, the pots must be set on a level spot, and gently, but thoroughly watered with a pot; the rose of which has been made particularly fine, for this and other such uses, and immediately plunged into a strong heat, without which, they will not be likely to vegetate: if a close dung hot-bed the better. A regular but moderate watering, steady heat, and occasional weeding, should any weeds appear, is all that they will now require till they be fit to be removed into separate pots; which may be done as soon as they have attained a few inches growth above their colyledons, or seed-leaves. There are some fruits, such as *Nelumbium*, whose exterior coat is so very hard, that the embryo plants are not able to burst through, at least with us; to remedy which, the knife is not unfrequently used to pare them thin, even to making a hole in them, but not too near the eye or part where they sprout. If the business of seed sowing be performed in spring, or early in summer, the smaller sorts may be expected to vegetate in the course of five or six weeks at farthest; whereas the larger bony kinds will sometimes remain dormant in the earth for the space perhaps of twelve months; this must be attended to, else one might think them beyond the chance of growing, and perhaps throw them

away without examination. Whenever there is any doubt of their vegetating, let some of them be taken up, and opened with a knife; when they will at once discover whether they be sound or not; if sound, they must be still kept in a strong heat, and regularly watered as before; for want of this simple precaution valuable seeds are often carelessly thrown on the rubbish-heap, when just bursting their shell or embryo; and not unfrequently, by that accidental check, are so materially injured as to prevent more than one half of them vegetating again, if they have been at all so fortunate as to be noticed and resowed."

Sweet, writing on the same subject, observes, "When seeds are received from abroad, some of them should be sown immediately, whatever season it may be; for sometimes seeds will grow when first received, which will not if kept some months longer: but the general time of sowing should be early in spring, that the plants may get strong before winter. A gentle hot-bed is best for bringing up most of the tropical kinds, but some few will come up better on a shelf, or a flue of the hot-house. The sooner seedlings are potted off the better, as they do not miss their moving when potted off very young; but seedlings are not so hardy, nor so easily preserved, as plants raised from cuttings, and seldom make so good plants; from cuttings they have stronger roots, and a greater number of them."

PROPAGATING TROPICAL PLANTS BY CUTTINGS.

The propagation of tropical plants, by cuttings, is by far more generally adopted than rearing them from seeds. As we have already observed, seeds of such plants are not often perfected in our stoves, but cuttings can always be had in plenty from plants that are properly treated, excepting from those which do not produce shoots fit for the purpose; but even most of those are capable of being increased by other means, which will be noticed in the sequel. The season best calculated for commencing the operation of increasing by cuttings, depends more on the state of the plants intended to be operated upon, than upon any particular day, week, or month. It

may generally, however, be considered a rule to begin early in the year, that the cuttings may be rooted, and fit to pot off by April or May, by which means they will be fully established in the pots to stand the hot suns of June, July, and August, during which three months they will make rapid progress, and will, by the end of October, be, if properly treated, handsome plants.

In regard to the season of commencing propagating tropical plants, by our own practice it is to begin in February, and even in some cases in January, and finish by the end of March; and for this purpose we use a close pit, and often a garden or cucumber frame, wherein a brisk heat is constantly and uniformly kept up from the time the cutting-pots are plunged in it till the whole have rooted, and are fit to pot off. After which they are removed to a nursing-pit, and kept growing by being kept moist, and never below 70 degrees of heat, if possible.

The Author of the Botanical Cultivator gives the following as his practice, which has been very extensive as a commercial grower:—"For the propagating of stove-plants a small house should be appropriated; a north-eastern aspect is preferable to any other, so as to have the morning sun, and none afterwards: they then want no artificial shading; for the less sun cuttings have before they are rooted, and the more light, the better. A pit might be made in the house, and one part of it filled with fresh tan, another part with rotten tan, and a third part with mould. In the fresh tan might be plunged, under hand-glasses or bell-glasses, any cuttings of plants requiring heat: in the rotten tan, under bell-glasses, any kinds not requiring heat; and in the mould, under hand-glasses, large cuttings of green-house plants," as we have already noticed, "which require no heat. Cuttings, particularly of hard woody plants, root best in fine sand, and are safer to pot off after being rooted, as the sand shakes clean from their roots without injuring them. When planted in mould, the roots are apt to break off in parting them: but some of the herbaceous or soft-wooded kinds will not root well in sand, and must therefore be planted in mould. Cuttings must be put in when the wood is fit Some kinds root

freely in either young or ripened wood; other kinds will only strike in very young wood, and others only in ripened wood. From Christmas till April may be considered as good a time as any to put in most kinds of cuttings, as they root more freely before the weather gets too warm; but some kind or other require to be put in every week throughout the year. No leaves should be taken off or shortened, except on the part that is buried in the ground, when the closer to the stem they are taken off the better. The more leaves a cutting has on it, the sooner it will root, though most propagators trim up their cuttings like a parcel of naked sticks, which is the very cause of their not succeeding. The shallower cuttings are put in the pots, they better they root, if they be but well fastened: if planted deep they are more likely to rot, or damp off; the sand or mould in which they are planted must be kept moist, but not too wet, and the glasses must be wiped occasionally; for too much moisture on them will make the cuttings turn mouldy, and rot off, even after they are rooted. When the young plants are rooted, the sooner they are potted off the better, in as small pots as they can be safely got into; for if too long in the cutting-pots, the sand is apt to injure their roots. When they are first potted off, they should be kept under a close glass for a few days, or in a frame on a gentle hot-bed, and shaded from the sun with a mat till they have taken fresh root: then harden them to the air by degrees. When the young plants are drawn up too slender, their tops should be pinched off, which will make them grow bushy. It is always best to top plants while young, if wanted to grow neat; if let run up high, the knife must be used, which causes a wound that sometimes is unsightly. No leaves should be taken off any plants except decayed ones, for it weakens them very much. Taking off a large leaf from a young plant will generally kill it; a circumstance that few cultivators are acquainted with."

Cushing, who was long a propagator in the Hammersmith nursery, has left us the following directions, which, although something lengthened, yet as it is different from our own practice, and also from that of the author last quoted, we will avail ourselves of the following extracts from his Exotic Gardener:

"The cuttings may be made almost every season of the year, yet the months of April, May, and June, are certainly the most proper, as the plants are at that season plentifully supplied with young wood, which, in most species, produce roots, when made into cuttings, much sooner than the old wood will if used in the same manner." After detailing the manner in which the pots should be prepared for the reception of the cuttings, which is not different from what we have already noticed in treating of green-house plants, he proceeds: "On the purity and clearness of the loam depends, in a great measure, the success of many of the tenderer kinds of cuttings, particularly those that are obliged to be kept in a moist heat, as it is, when contaminated with other composts, very liable in these situations to cause damp and rottenness by the particles of putrifying matter generally contained in mixed earths, and the properties of which are put in motion by the application of heat. As an exception to this rule, may be adduced sand, which is of great utility to mix with loam, should it happen to be rather stiff, for the nature of the cuttings; but then the sand proper for this use is of so pure a nature in itself, that it is evident it cannot have the effect noticed above in regard to mixed soils." In regard to the choice of cuttings, the following observations are also in some degree different from that which we have already noticed. In selecting cuttings, the same author observes, "preference should be given to the firmest wood, of the same year's growth; and of these, only such whose leaves have attained their full size and proper colour, which are generally to be selected from the lateral shoots, as the upright leading shoots are mostly too luxuriant to make good cuttings. The cuttings of many plants, if taken from the lateral shoots, never become proper erect stems, but are inclined at all times to form an irregular, bushy, weak head: this is but of small importance to those collectors who cultivate plants merely for the flower, as such heads generally produce them sooner than luxuriant leaders. The lovers of handsome erect plants, however, choose their cuttings from the upright shoots early in the season, before they acquire that luxuriance of growth so unfit for the purposes of propagation. The tops of the shoots are to be preferred, unless they happen

to flag before used. To prepare them for insertion, most of the leaves must be trimmed off close to the stem, leaving only a few at the top, to allow a free respiration of air, so necessary to the life of the plant. This is a most essential article in the art of making cuttings, particularly those of evergreens; for if they be deprived entirely of their leaves, or that they otherwise flag, or occasionally fall off soon after they are put in, there will be little or no chance of their growing. The reason is obvious, because the inherent sap of the cutting being deprived of these organs of respiration that keep it in motion, and the cutting having no roots, by the efforts of which to produce new leaves, the sap consequently becomes stagnated in the pores of the wood; which, like the stagnation of the blood in animals, will, in all likelihood, prove mortal, by occasioning an immediate mortification." In preparing the cuttings, and inserting them, he observes: "In shortening each cutting to the most convenient length, care must be taken to do it with a clean cut, in a transverse direction, at a joint, and by no means should they be left exposed, or to lie any considerable time before planting. In planting, a small dibble, or other convenient instrument, should be used to press the loam sufficiently tight to the base of the cutting, as that is the principal part to be made fast. As soon as the whole are inserted, and the surface of the mould made level, and a little firm, give them a gentle watering to settle them; they should be left to soak about a quarter of an hour, and then covered with a bell-glass, which should be pressed pretty tight, so as perfectly to exclude the outward air. The atmospheric air being prevented by the glass from exhaling any of the juices of the plant, all its powers are forced downwards to produce roots, and these will soon prove their existence by producing young leaves and branches. If there be several cuttings of the same sort, they may be all put in one pot, unless they happen to be very large or curious sorts; but, in general, each species should be kept in a separate one, on account of the difference of time that some of them require to strike roots, and also that any scarce or valuable kind should be put only one in a small pot, as they are then not liable to be injured so much by damp, neither do they

require to go through the precarious operation of separate potting so soon after being struck. Should it be requisite to have a considerable number of cuttings made at the same time, it would be proper to have a one-light frame with close sashes, placed on a moderate hot-bed ready to receive them. It should be covered with saw-dust or clean tan, about a foot deep, in which to plunge the pots; but if there be only a few done, they may be plunged in any frame, amongst other things, provided there be a moderate heat." Many stove-plants strike so readily, that some cultivators put up a small hot-bed on purpose, which may be of the size of one or more lights, according to the number intended to be propagated; when this bed has come to a proper temperature, it is earthed over to the depth of a foot or fourteen inches, with the mould most congenial to the majority of the plants to be propagated. In this mould the cuttings are inserted pretty close together, and there they remain until rooted, when they are taken up and potted off in the usual manner. The principal feature of this method is, that the bed resembles what we may call one large pot, into which the cuttings are placed, the frame and lights being perfectly tight, act, as it were, in the place of a corresponding large bell or hand-glass; very little air is consequently given while the cuttings remain without root, but as these are formed, air is admitted gradually to them. All the while damp must be carefully guarded against, and all appearance of it removed when it occurs.

Dry-stove plants are propagated in the same manner, with the exception of such as are succulent. In regard to them, the cuttings or pieces of the branches should always have their top left uninjured, and none of the leaves removed where they exist, excepting such as would be inserted under the mould: such only should be removed, and that carefully, so as not to lacerate or wound the stem of the cutting. When the cutting is removed from the parent-plant, it should be laid by to dry for some days, more or less, according to its succulency; for if planted immediately after being separated from the plant, they would be apt to rot or damp off. Some species of these plants may, however, be planted as soon as taken off, but by

far the greater part will require this precaution, and may in some cases remain unplanted for a week or more. Those of this division of plants that make no side-shoots, like many of the *Aloes*, and some other genera, generally send up suckers from the roots, these should be taken off carefully, and when dried a day or two, planted at once into pots corresponding to them in size, &c.; others send out offsets from their trunk or branches, which should be gently rubbed off, and treated like suckers; some of them are, however, so short, as to admit of no part being inserted in the ground; but such is the facility with which most of such plants reproduce themselves, that if they be only laid on the surface of the mould, and slightly fastened down, so as to prevent them falling off, they will emit roots, and soon fix themselves in the mould.

In regard to the management of tropical cuttings, while forming their roots, much attention is required. A steady brisk heat must be kept up, and attention paid to shading, watering, &c. On this part of their culture, Cushing makes the following observation:—"They will now require the most particular attention as to watering and shading. The water must be given twice or thrice, very moderately, until the earth becomes sufficiently moist, which, if once so, will retain the moisture for a length of time by being covered with the glass; but the shading is the principal care, whenever the sun's rays fall on the glasses, as nothing will create rottenness sooner than letting the leaves flag, and lie upon each other, which will be the positive consequence of a want of shade. The most advisable method to obtain this end, is to have a few large sheets of strong paper to lay over the glasses within a frame, which, at the same time it shades the cuttings, does not prevent the sun's rays from entering the frame, and clearing off any damp that may be accumulated therein, whereas, if mats be laid on the outside of the frame-light, it is evident they will tend to have the direct contrary effect. However, in the course of a week or a fortnight they will be able to withstand a little of the rays of the morning and evening sun," and should afterwards be gradually accustomed to it until they can stand it with safety.

GENERAL CULTURE OF TROPICAL PLANTS.

Having so far enlarged on the propagation of tropical plants, we will now offer a few observations on their general culture.

As the majority of tropical plants are of rapid growth naturally, and rendered still more so by the close and high temperature in which it is necessary always to confine them, in a state of cultivation, it naturally follows that some are short lived, and many more are drawn up in the course of two or three years, so as to become naked at their bottom, and often very unsightly. Repeated propagation is the principal object to be had in view, so that as the older plants become either sickly, ill grown, or too large for the space allotted to them, they may be dispensed with, and their places supplied from the young stock. There is, however, this objection to that rule, that if the object of the cultivator be to have large and magnificent specimens, care must be paid to cultivate fewer in number, so as to afford sufficient room for them to extend themselves on all sides; and if sufficient room be allowed them in the pots or tubs, and abundantly supplied with water, and sufficient temperature kept up, most stove plants will attain a large size in a short period. Large specimens of these plants should be allowed a house for themselves, and a smaller house should be allotted for those of smaller growth.

WINTER TREAMENT OF STOVE PLANTS IN GENERAL.—TEMPERATURE.

All plants are naturally subject, in a certain extent, to the vicissitudes of winter, spring, and summer, it follows, therefore, that, in a state of cultivation, something analagous should be followed by the cultivator in imitation of those changes. To keep tropical plants at a high temperature during winter, when there is little sun-shine, is to excite their growing principle at a period when they should rather be at rest; and where such a practice is followed, the plants become drawn up weak and leafless, in consequence of the perpetual, or we may say, in this instance, unnatural, stimulus to excitement, which the application of heat produces. It appears from practice and observation, that the temperature of the plant stove should be kept as

near to from 60 to 65 degrees as possible, during the dark days of winter, for all that is then required is to prevent the plants from being checked or chilled by cold during that season, so that, as spring naturally comes on, a farther, but gradual stimulus may be given them by additional heat, and most particularly during the day.

WATERING.

Water must not be entirely withheld, particularly from some species, but a much less quantity of it is necessary than when the plants are in a growing state, and able to decompose a greater portion of that element. Some species require none for several weeks together, and such may be ascertained by their habits of growth, and are of the herbaceous and bulbous sorts. As these naturally ripen their foliage in autumn (or at whatever other season), and appear to die down to the ground, they should be observed, and collected as near together as circumstances will admit of, and a suspension of watering should then gradually take place, and be continued in, till they begin to show signs of vegetation in spring, when they should be again supplied as usual. Some species which require very little water during winter, do not lose their leaves, nor die down to the surface of the pots; but it is only observation on the part of the cultivator, that can direct him in these instances when to water, and when to withhold it. It is (as we have repeatedly observed) one of those cases in horticulture for which rules may be laid down, but not wholly without exceptions, and must entirely rest on the judgment of the cultivator. Steaming the stove during winter is a material feature in the best management of such plants, and should be scrupulously attended to, both to soften the atmosphere of the house, as well as to prevent the increase of insects, particularly the red spider, which is sure to make its unwelcome appearance in a high and dry atmosphere. The most eligible time for steaming the house is in the evening, when the flues are hottest, and it is performed by pouring water on them, which generates steam readily. In time of very severe frost, this operation may be performed during the day, or dispensed with for a few days altogether.

The quantity of water required to produce a sufficiency of steam, depends on a variety of local circumstances, such as the size of the house, the way in which the water is put on the flues, &c. But it may be safely asserted, that more than is necessary is often used when it is poured on them by random, or done in too hurried a manner. In steaming all sorts of hot-houses, as well as in their whole management, it can only be expected to be well done when the operator feels an interest or pleasure in doing it. A few minutes more spent in applying it regularly and leisurely over the whole surface of the flues, will do much more good than sluicing a hogshead of water over the house in a careless manner.

VENTILATION.

During the winter months very little ventilation is required in these structures, for, unless the house be unusually well glazed, and in complete repair, a sufficiency of fresh air will find its way into it between the laps of the glass, and other openings. Indeed, greater care should be had to the exclusion of cold air during winter, than to its admission. The plants are, for the most part, (as observed above,) in an inactive state, and, therefore, not in want of those gasses which compose certain parts of atmospherical air, and which are found so necessary for them when in a growing state.

INSECTS.

The destruction and prevention of insects should be always before the eyes of the cultivator, who is ambitious of healthy and fine plants; during winter there are some species of them that make their appearance, or are probably permanently on the plants. Carefully examining plant by plant, and leaf by leaf, is the only sure and effectual method of getting rid of them; it is often objected that such a method is tedious, but let it be recollected that if so, it is sure, and time can better be spared during bad weather for this purpose, at this season, than at any other. Many boasted remedies have been puffed up for the total suppression and prevention of them, but when re-

duced to practice have been found of little avail. If any thing can be applied in a general way for this purpose, it appears to be one of those gasses, which are destructive to animal life, while, at the same time, it is not injurious to that of vegetables.

Insects are probably, in all cases, the effects of bad management, and the effects of disease more than the cause of it. When plants are well cultivated, and kept in a growing state, few insects appear to molest them; but whenever they become sickly, insects are sure to follow.

SUMMER TREATMENT OF TROPICAL PLANTS.— TEMPERATURE.

Fire-heat cannot safely be dispensed with in most seasons before the end of May, and should be regulated according to the coldness or warmth of the weather. The temperature, however, should begin to increase above that specified for the winter season about the beginning of February, and should be progressively increased as the plants begin to shoot out, and as the sun gets higher in our horizon, from 60° to 65°, it should be gradually increased to 70°, 75°, and by the end of March, or the beginning of April, may stand by sun-heat at 80°, and by fire-heat at or about 75 degrees, at the time of doing up the fires for the last time at night. This additional heat is necessary to be kept very steadily, for nothing is so injurious to plants as sudden transitions from a high temperature to a cold one, or the reverse. It is also necessary, at the above periods, to increase the temperature as the plants are then beginning to grow, and should be supplied with every stimulus abundantly to enable them to make proper shoots, for without the shoots are freely grown, they cannot be expected to produce flower-buds nor handsome plants. It is at the setting out of the season that this is to be effected, and not afterwards. Not but that many plants will shoot out a second time after being checked in their growth by want of heat or other causes; but let it be remembered that, with by far the greater part of valuable plants, such wood is seldom

sufficiently ripened in autumn to produce flowers the succeeding season, or to produce them in the same season in perfection.

WATERING.

As the plants begin to grow, and the season advances, water must be supplied more liberally than hitherto, and if the plants be vigorous, and the pots have been properly drained previously to the plants being put in, then we may almost say that, with regard to the majority of the tropical plants in the moist stove, that they cannot scarcely have too much water supplied them. There are exceptions, and the chief of those are, sickly plants, succulent plants, such as have not began to vegetate, and such as are naturally impatient of much moisture. As the days begin to grow mild, and the sun to have some influence, syringing the plants over head should not be neglected, both to refresh and clean the foliage, and also to create a moist soft atmosphere within the house. At first, this mode of watering should be moderately done with a fine cap on the syringe, so as to resemble dew more than rain, and should be performed in the mornings before the sun is full upon them; but, as the season advances, it should be given in a much greater quantity, and with a moderately coarse cap, so that the foliage may be thoroughly washed, and cleared of dust and insects dislodged from under the leaves, young wood, and other hiding places. Towards the end of April, the operation may be performed in the afternoon before the sun is fully off the house, and by the end of June, in the evening about six o'clock. This method of watering is not intended to be sufficient for the plants; for watering at the roots must also be attended to, as the plants may appear to require it, but not oftener. The water used at all times, in the early part of the season, should have stood some time within the house to equalize its temperature, or be rendered fit by the addition of water heated for the purpose. By the month of June the water from the cistern in the back-sheds, or under any other cover (except under ground), will be sufficiently warm. In watering over head, whether with the syringe, or otherwise,

during the heat of summer, and late in the spring, when the sun is then powerful, particular care should be taken that the operation be performed before or after the sun acts too powerfully on the house; for if done when it shines in full strength on the glass, the foliage would be liable to sustain serious injury. For the particles of water thrown on the plants form themselves into little spherules on the leaves, the surface of which spherules collect the rays of heat in a considerable degree, more or less, according to their convexity, and the consequence is, that the leaves will be burned into holes wherever the focus is formed.

VENTILATION.

As the season advances, ventilation must be increased; but before the beginning of June, it is seldom necessary that it be indulged in to any great amount, a few inches of the lights being opened during the middle of the warmest days in March and April will be sufficient. But care must be taken that the house be shut up before the sun goes off it, as by that means the temperature of the house would fall too low before the usual time of lighting the fires, and, consequently, the plants would either become chilled, or else the fires will have to be lighted sooner, in order to keep it up, and thus occasion a waste of fuel that might be much better saved; for as sun-heat is much better than fire-heat, the less of the latter that is used, and the more of the former that can be retained, the better. By the middle of June, a change of air may be more freely admitted, and during July, and part of August, more bountifully indulged in. By the beginning of September it should be reduced, and so gradually to the end of autumn.

INSECTS.

During the spring months, insects will be rapidly increasing in numbers, and at that period are most injurious to plants, by attacking the young shoots and leaves. The process of picking them off should be attended to on all proper occasions,

and if persevered in, will keep them under. The red-spider is easily subdued by brushing the flues over, when heated, with a mixture of flour of sulphur and water; but if the engine or garden-syringe has been sufficiently used, there will be little fear of its making its appearance. The aphides, or green fly, as well as the thrips, are destroyed by the well-known remedy of tobacco-fumigation, which should be had recourse to whenever it makes its appearance.

SHIFTING TROPICAL PLANTS.

Cultivators, for the most part, begin a general shifting or re-potting of their stove-plants about the middle or end of April. However convenient the practice of a general shifting may be, still it is subject to many objections. All plants do not require to be annually shifted, but are found to flower better when that operation is less frequently adopted. All plants, even in the same house, do not begin to vegetate at the same season; and, as the time when they begin to grow appears the most natural to supply them with fresh food, it therefore follows that they should be shifted only as they attain that state. However, having made these observations, we may detail the process for brevity's sake under this general head, and, according to our usual method, give the essence of the practice of others, as well as that of our own. On this subject, Cushing observes, "Being fully prepared, let a part of them be taken to the potting-shed together, that they may be no longer than necessary out of the stove: and, while these are shifting, the operation of turning the tan-beds should be proceeded with;" but there are few modern cultivators who now use tan, as we have already noticed. After detailing this process, which differs nothing in principle from what we have explained in the pine-stoves, (*see Forcing Garden,*) he proceeds, "In shifting the plant, the greatest nicety should be used not to injure the roots: because, if the roots, from a multiplicity of wounds, (which are more frequently lacerated than cleanly cut,) once become cankered, or contaminated in any manner, the branches must also be expected to suffer and

decay." In preparing the roots of the plants, previously to their being repotted, he justly reprobates an old and erroneous practice, long pertinaciously adhered to by cultivators of the old school, that is, "that of paring off the best part of the roots with a knife, that is the tips or ends of the fibres, which are undoubtedly the active agents in collecting the food for the stem, &c. Then, without ever loosening the remaining part of the ball, set in the new pot with a little fresh earth thrown loosely about it: as a matter of course they think it must be completely drenched or flooded from the water-pot; and lastly, to crown the whole, perhaps immediately set it in a pan of water, when, if they only took time to consider the mutilated state to which they have reduced the roots, it is impossible they could ever conceive them to be in a state fit to undergo such treatment with any kind of advantage. But it is the misfortune of many, who will not for a moment hesitate to undertake the care of tender and curious plants, as a matter easily understood, yet will not take the trouble of judging for themselves to follow the old tract of cutting and watering, the same, as they may have before seen practised on the hardiest geraniums or myrtles. Though the method may not seem to hurt some few kinds of strong freely growing plants, yet it never can be allowed as a proper mode of treatment for all plants indiscriminately, because they may happen to have a good portion of roots: indeed more plants have been destroyed by this practice than by any other particular part of the system of management which some so blindly follow. There are instances, however, wherein a knife is necessary to the roots, as well as the branches, viz. when they become broken, or otherwise contaminated, and also to such as are propagated by cuttings of the roots, as some species of *Geranium* may be, some *Mimosæ* also, and indeed any that are observed to produce suckers; in all such cases they should be taken off with precision, and a sufficiency left to support the parent, if considered worth preserving. In turning the plant carefully out of the pot, observe if the roots have perforated it in any part, so as to render it impossible to part them without breaking the one, or lacerating the other, in which case prefer the former as the slightest damage: however, when the ball of roots

is divested of its pot, let the broken tiles, or whatever substance be used in draining, be carefully picked out without tearing off the roots which may have grown amongst them; also any caked or mossy substance on the surface, which will come easily off with the fingers. Then proceed to loosen the earth, and matted roots by gently patting them on the side of the ball with the hand, or otherwise, so as to open the pores of the earth without cracking the roots: shake off any loose earth, and, having a proper sized pot ready prepared, put in a quantity of the fresh mould sufficient to raise the crown of the roots to about half an inch below the rim of the pot, on which set the plant, and add more earth, lightly shaking it in among the fibres: let the whole be pressed moderately tight, but not so as to render it hard in the least degree, nor by any means using a stick for this purpose, (another never-failing attendant on the former practice,) by which the roots are extremely liable to be torn or bruised; add mould sufficient to raise the surface level with the rim of the pot, as it will settle to a proper depth with watering, and smooth the whole off neatly with the hand." When the whole are repotted in this way, they are immediately removed again into the stove, and, by shading and attention to watering, &c., are soon re-established to a growing state.

On the same subject Mr. Sweet, in his Botanical Cultivator, remarks, " In potting plants, care should be taken to drain the pots well with broken potsherds, or rough bits of turf; for nothing injures them more than letting them get sodden with too much wet. The best time to shift them into fresh pots is in spring, but some will require to be shifted again in autumn, to have them thrive well. The freely growing kinds cannot be well over-potted, if there be plenty of room for them in the houses; they will thrive and flower better for being in large pots. Others that are more tender, should be kept in as small pots as possible, as they may not get sodden and lose their roots."

Our practice has been to shift only such plants, and at such periods, as they may seem to require it, whether in spring, summer, winter, or autumn; and, having the pots either new or well cleaned and drained, pot them, without injuring the roots

as little as possible; but, at the same time, reducing the ball, so that the pot may contain as little of the old exhausted mould as possible, which, having supplied the plant for some time previously, cannot possibly contain any store of sustenance for it in future; and, if left undisturbed of any size, prevents a sufficient quantity of new matter being put in the pot for its future supply. Unless in the case of very delicate species, or tender-rooted sorts, there is much less danger in entirely reducing the ball and cutting out the decayed or broken roots, than there is evident injustice done them by re-potting with the balls almost entire, and only adding from a quarter of an inch to an inch of fresh mould round the roots, which is all that the plant has to support it; the interior of the pot being filled with a hard ball of exhausted useless mould, in which no root will hardly live, far less prosper. By the latter method, plants of a large size may be well grown in comparatively small pots, as the whole body of mould is in a fresh state, and, consequently, fitted for the purpose it is intended; whereas, by the former method, plants scarcely a foot in height we often see occupying a pot nearly as much in diameter. Nothing looks worse than small plants in large pots; and, such is the case, that such plants never prosper.

REMOVING TROPICAL PLANTS OUT OF THE STOVE.

A very common practice exists amongst cultivators to remove a large portion of their stove plants into the green-house during the warmer weeks of our summers. So far this is beneficial to some of the plants, that it admits of them standing much thinner, and, consequently, enjoying much more air and sun-shine. But, in carrying this practice into execution, we would recommend that the hardier species be chosen to be thus set out. Many of the delicate kinds, particularly those from the warmer parts of the tropics, cannot be injured, but be much benefited by all the heat that they can have, even in our stoves, during summer; and as air can be admitted, at least it should be admitted to them by opening the ventilators or sashes of the house, they will thereby enjoy a sufficiency of that element without removal at all. However, when the house is crowded,

those that are hardiest, as noticed above, may be taken out. In regard to some of the inmates of the dry-stove or succulent-house, the case is otherwise, many of them are found to do better and to flower much freer when set out during summer. This is particularly illustrated in the case of some of the *Cactuses*, which seldom flower, if not exposed either to the temperature of the green-house or open air for a considerable period of the summer. When the plants are so set out, an opportunity will be afforded of cleaning such as are infected with insects; and, for this purpose, the practice of Cushing may be adopted. "When the plants are set out in summer," says that author, "every part of the house should be well washed with strong soap lees, in which a little of the same tobacco as is used for fumigating has been infused, in particular all the joints of the wood work, and also whatever nail-holes, or other crevices, may happen to be therein; as, in those places, some of the species, more especially the white mealy bug, is much inclined to secrete itself for breeding.

AUTUMNAL TREATMENT OF TROPICAL PLANTS.— TEMPERATURE.

Towards the end of September, or beginning of October, the evenings will begin to get cold, and, in order that the stove plants may not experience any check at this time, when most of them are in full foliage, it will be necessary to resume the use of fire-heat. This may be commenced with by only lighting the fires in the evening, and thereby merely warming the flues, which will diffuse a mildness through the house, which, in damp weather, will, in particular, be of much importance to them.

To have tropical plants look well, the period of winter should be shortened as much as possible by artificial means, and this can only be attained by lengthening out the autumn, as it were, by an application of fire-heat, when that from the sun becomes insufficient; and again, by bringing on spring at an early period by the like means. Tropical plants, in general, sustain more injury from allowing them to be checked in growth at this

period, much more so, than by any reasonable degree of coldness in the house during winter; an almost total stop is put too suddenly to vegetation, and, as a consequence, the juices of the plants are stopped while in full vigour, become stagnated, and soon vitiated; disease follows, and insects immediately commence their attacks; besides, the wood of many of the shrubby kinds are not properly matured, or what is technically termed ripened; and either a similar circumstance follows, or the buds do not expand into flowers in spring, from being not fully matured in autumn. It is well known that a favorable autumn has a very material effect in ensuring a crop upon trees in the open air, and it must have exactly the like effect upon those trees or plants under glass.

WATERING.

As the growing season of the plants draws to a termination, the supply of water must also be gradually diminished; and care must now be taken that none of them sustain injury from an over-abundant supply of it. The plants set on the bed, as they will be considerably shaded, and at a distance both from the glass and also from the action of the heat from the flues, will require to be attended in this respect, as the water which they receive from the syringe may be sufficient for many of them, particularly such as have ripened their wood, and all that are naturally deciduous. Those on the kirbs, or over the flues, will now, however, have to be supplied with an additional quantity, as they, particularly the latter, will be liable to be dried up, as the temperature is kept up by fire-heat. Nothing is so injurious to stove plants during autumn and winter, as an injudicious application of too much water, for it not only stagnates at their roots, but is apt to chill the house too much, particularly towards the surface of the bed on which the plants stand. Steaming should again be commenced with, which is of itself a species of watering, and syringing should be persevered in, but with moderation. It should also be observed, that the water used both for syringing and also for application at their roots, should be placed in the house some hours previously to using, or otherwise warmed to nearly the minimum heat of the house.

VENTILATION.

As the cold weather approaches, ventilation should be lessened, both as the admission of air would tend to lower the temperature of the house, and also as the plants do not require so much of it at this season as hitherto. When from the heat of any warm days that occur, that opening the sashes may become necessary, it should only be for a short time, as the warmer the house is shut up at night, the less fire-heat it will require to maintain a proper degree of heat throughout the night.

INSECTS.

Insects, the almost constant attendants on tropical plants, will still require looking after. The means already proposed may be adopted, or others that may be more effectual may be devised by the cultivator; at all events, vigilance and repeated application are necessary to keep them under.

AN ENUMERATION

OF THE PRINCIPAL GENERA OF

HOT-HOUSE OR TROPICAL PLANTS.

WITH THE SOIL EACH GENUS THRIVES IN.

INCLUDING THE MODE OF PROPAGATION, WHETHER FROM SEEDS, ROOTS, CUTTINGS, &c. &c.

Genera.	Soil.	Mode of Propagation.
Abroma	Peat and loam	By seeds and cuttings.
Abrus	Loam and peat	By cuttings.
Acacia	Peat and loam	By cuttings, seeds, and cuttings of the roots.
Acanthus	Rich loam	By cuttings.
Achania	Loam and peat	Cuttings taken from the tips of the young shoots root freely.
Achras	Rich loam	Cuttings strike freely.
Achyranthus	Rich light loam	By seeds and cuttings.
Acrostichum	Decayed veget. matter	By seeds, which may be brushed off the backs of the fronds, and by dividing the roots.
Adansonia	Rich loam	By cuttings.
Adelia	Rich loam	Cuttings root freely.
Adenanthera	Loam and peat	Large cuttings, with the leaves left on, root freely.
Adiantum	Decayed veget. matter	By seeds, or by dividing the roots.
Ægle	Rich loam	Cuttings of the ripened wood root freely.
Ærua	Light rich soil	By cuttings.
Æschynomene	Rich loam	By seeds.
Agava	Poor sandy soil	By suckers.
Aglia	Loam and Peat	Cuttings that are ripened at the base will root freely.
Ailanthus	Loam and peat	By cuttings of the roots.
Alanguim	Peat and loam	Cuttings root freely.
Aleurites	Rich loam	Cuttings of the ripened wood, having the leaf left entire, will root.
Allamanda	Rich light soil	By cuttings.
Aloe	Lime rubbish	By suckers, which are produced abundantly.
Alpinia	Rich sandy loam	By dividing the roots.
Alstrœmeria	Rich light soil	By seeds, and by parting the roots.
Alyxia	Sandy loam and peat	Cuttings of the ripened wood strike root.
Amaryllis	Rich light soil	By seeds, which are sometimes produced, and by offsets from the bulbs.

	Soil.	Mode of Propagation.
Amerimnum	Rich loam	Cuttings with their leaves left entire will root freely.
Amomum	Rich sandy loam	Same as *Alpinia*.
Amyris	Loam and peat	Cuttings root readily.
Anacardium	Light loamy soil	Cuttings of the ripened wood strike root.
Anemia	Decayed veget. matter.	By seed, and dividing at the root.
Angelonia	Light rich soil	Cuttings root freely.
Angræcum	Turfy peat	By dividing the roots.
Anguria	Light rich soil	By seeds and cuttings.
Anona	Rich loamy soil	Cuttings of the ripened wood strike freely.
Antidesma	Rich loam	By cuttings of the ripened wood.
Aphelandria	Light turfy loam and peat	Cuttings of the young wood strike root.
Aralia	Rich loam	Ripened cuttings strike freely.
Ardisia	Peat and loam	By seeds and cuttings.
Areca	Light sandy loam	Only by seeds.
Aristolochia	Sandy loam and peat	Cuttings root freely.
Artabotrys	Sandy loam and peat	Cuttings of the ripened wood root freely in a brisk heat.
Atrocarpus	Rich loam	By cuttings of a large size, having their leaves entire.
Asclepias	Light rich mould	Cuttings root freely.
Asplenium	Decayed veget. matter.	By seeds, and by dividing the roots.
Aspidium	Decayed veget. matter.	By seeds, and by dividing the roots.
Astrapæa	Rich loam	Young cuttings root freely.
Atalantia	Light turfy peat	Cuttings of the ripened wood root freely.
Averrhoa	Sandy loam	Ripened cuttings strike root.
Avicennia	Loam and peat	Ripened cuttings strike root.
Ayenia	Rich light soil	Readily by cuttings.
Bactris	Sandy loam	Only by seeds.
Bambusa	Rich loam	By offsets.
Banisteria	Sandy loam	Cuttings of the ripened wood root freely.
Barleria	Rich loam and peat	Cuttings of the young shoots root freely.
Barringtonia	Loam and peat	Cuttings of the ripened wood root freely.
Bassia	Light loam	Ripened cuttings root freely.
Bauhinia	Rich loam	Cuttings of the half-ripened wood strike best.
Begonia	Rich light soil	Readily by cuttings.
Besleria	Light rich soil	Cuttings root very freely.
Bignonia	Loam and peat	By cuttings, but not very readily.
Bixa	Loam and peat	Easily by cuttings.
Blakea	Peat earth	Cuttings of the ripened shoots root, but not very freely.
Blechnum	Decayed veget. matter.	By seeds, and by dividing the roots.
Bletia	Turfy peat	Rapidly by dividing the roots.
Bocconia	Rich light soil	By seeds, which ripen abundantly.
Boerhaavia	Rich loam	Cuttings root freely.
Bombax	Rich loam	Half-ripened cuttings root freely.
Bontia	Loam and peat	By cuttings.

	Soil.	Mode of Propagation.
Bouvardia	Loam and peat	Cuttings root freely.
Brassavola	Light sandy soil	With difficulty by parting at the root.
Brassia	Light sandy soil	Readily by dividing at the root.
Brexia	Peat and loam	Cuttings of either the old or young wood root readily.
Bromelia	Rich loam	By suckers, which are produced in abundance.
Brosimum	Loam and peat	Large old cuttings only will root.
Brownea	Loam and peat	Cuttings of the ripened wood root freely.
Brucea	Rich loam	Cuttings of the ripened wood root freely.
Brugmansia	Rich loam and peat	Cuttings of the young wood root freely.
Brunsfelsia	Loam and peat	By cuttings.
Bryonia	Rich light soil	Young cuttings root freely.
Bryophyllum	Light sandy soil	Cuttings root freely, as does also the leaves.
Bubroma	Light loam	By cuttings.
Bucida	Loam and peat	Cuttings of the ripened wood root freely.
Bumelia	Loam and peat	Difficult to increase by cuttings.
Buonapartea	Parasitical.	
Bursera	Rich light soil	Cuttings of a large size root freely.
Burchellia	Loam and peat	Half-ripened cuttings will root freely.
Butea	Loam and peat	Cuttings with their leaves uninjured will root in a brisk heat.
Cacalea	Light sandy loam	Cuttings when partially dried root freely.
Cactus	Light sandy loam	Cuttings when partially dried root freely.
Cadia	Peat and loam	By cuttings.
Cæsalpina	Loam and peat	Difficult to increase. Sometimes the half-ripened wood will root in a moist brisk heat.
Caladium	Rich soil	By the tubers of the root.
Calamus	Sandy loam	Difficult to increase.
Calea	Rich soil	Cuttings root freely.
Calenchoe	Sandy loam	By the leaves.
Callicarpa	Loam and peat	Cuttings of the ripened wood root freely.
Calophyllum	Turfy loam and peat	Cuttings of the ripened wood root freely.
Calyptrion	Loam and peat	Cuttings of the young wood root freely.
Cameraria	Loam and peat	Readily by cuttings.
Canella	Loam and peat	Large cuttings of the old wood strike best without being deprived of their foliage.
Canna	Rich loam	By seeds, and dividing the roots.
Capparis	Rich light loam	Cuttings root readily.
Capavaria	Peat and loam	Cuttings root readily.
Capsicum	Rich soil	By seeds.
Carica	Loamy soil	Large cuttings not deprived of their leaves strike root in sand.
Carissa	Loam and peat	Readily by cuttings.
Carolininea	Rich loam	Cuttings taken off at a joint, and their leaves left entire, will root in heat.
Caryota	Sandy loam	Managed like the other palms.
Cassia	Rich loam	By seeds and cuttings.
Calalpa	Light rich loam	Cuttings root readily.
Catasetum	Managed like the other orchideous plants.	

	Soil.	Mode of Propagation.
Catesbæa	Turfy loam	By cuttings.
Cattleya	Managed like the other orchideous plants.	
Ceanothus	Loam and peat	By cuttings.
Cecropia	Rich loam	Large cuttings root in sand.
Cedrela	Loam and peat	By cuttings.
Cerbera	Loam and peat	Cuttings root freely.
Cheirostemon.	Turfy loam	Cuttings of the ripened wood root freely.
Chiococca	Loam and peat	By cuttings.
Chloranthus	Loam and peat	Readily by cuttings.
Chomelia	Loam and peat	Cuttings root freely.
Chrysophyllum.	Sandy loam	Ripened cuttings will root in a strong heat.
Cicca	Sandy loam	Cuttings of a large size with their leaves entire will strike root.
Cinchona	Loam and peat	Cuttings of the ripened wood sometimes root.
Cissus	Rich light soil	Cuttings root freely.
Citharexylum.	Loam and peat	By cuttings.
Clematis	Rich light soil	Young cuttings root freely.
Cleome	Light rich soil	By seeds, which ripen freely.
Clerodendrum	Light rich soil	Cuttings of the very young wood, as well as pieces of the roots, make young plants.
Clitoria	Loam and peat	Cuttings root freely.
Clusia	Light sandy loam	Readily increased by cuttings.
Coccoloba.	Rich loam	By cuttings.
Codarium	Loam and peat	Ripened cuttings strike root.
Coffea	Rich loam	By seeds and cuttings of the ripened wood.
Coix	Rich soil	Seeds are plentifully produced.
Colbertia	Sandy loam	Ripened cuttings root freely.
Columnea	Peat and loam	Readily increased by cuttings, but easily lost if too much water be given it.
Combretum	Loam and peat	Only by layers.
Commelina	Sandy loam and peat	By dividing the roots, and by seeds.
Conocarpus	Loam and peat	By cuttings.
Cookia	Sandy loam and peat	Cuttings of the ripened wood root freely.
Copaifera	Sandy loam	Cuttings of the ripened wood root freely.
Cordia	Loam and peat	By cuttings.
Cornutia	Loam and peat	By cuttings.
Costus	Loam and peat	By dividing the roots, and by seeds.
Cotula	Rich light loam	Cuttings root readily.
Cratæva	Loam and peat	By cuttings.
Crinum	Rich loam	By suckers at the roots, and by seeds.
Crossandria	Light rich soil	Cuttings root freely.
Crotalaria	Loam and peat	By cuttings of the young shoots, and some species by seeds.
Croton	Loam and peat	By cuttings.
Curatella	Sandy loam	Cuttings of the ripened wood root freely.
Curculigo.	Loam and peat	By offsets from the roots.
Curcuma	Loam and peat	By offsets from the roots.
Cyathea	Decayed veget. matter	By seeds, and dividing at the root.

	Soil.	Mode of Propagation.
Cyeas	Sandy loam	By knobs, which form round the roots.
Cymbidium	Sandy peat	By parting at the roots.
Cynanchum	Peat and loam	Cuttings strike freely.
Cyperus	Rich soil	By dividing at the roots.
Dalbergia	Sandy loam	Cuttings of the ripened wood root freely.
Dalechampia	Loam and peat	By cuttings.
Daphne	Rich loam and peat	Ripened cuttings will root in sand.
Dendrobium	Turfy peat	By dividing at the root.
Dichondra	Peat and loam	Cuttings root freely.
Dicksonia	Loam and peat	By seeds, &c., like all other ferns.
Dillenia	Light loam	Ripened cuttings with their leaves entire root pretty freely, and seeds are occasionally procured from India.
Dimocarpus	Rich loam	Cuttings of the ripened wood root freely.
Dioscorea	Rich loam	By parting the roots.
Diplazium	Decayed veget. matter	By seeds, or by dividing at the roots.
Dolichos	Light rich soil	By seeds, and sometimes by cuttings.
Doryanthus	Rich loam	Sometimes suckers are obtained from old plants, but sparingly.
Dracæna	Rich loam	Cuttings root pretty freely.
Dracontium	Rich loam	By dividing the roots.
Duranta	Loam and peat	By cuttings.
Echites	Loam and peat	By cuttings.
Elæagnus	Loam and peat	Cuttings of the ripened wood root freely.
Elæocarpus	Loam and peat	Cuttings of the ripened wood root freely, and seeds may be obtained by assisting the impregnation.
Elæodendrum	Peat and loam	Cuttings of the ripened wood root freely.
Elettaria	Rich sandy loam	By dividing at the root.
Embryopteris	Sandy loam	Ripened cuttings strike freely.
Ephielis	Light loam	Cuttings of a large size root freely.
Epidendrum		Parasitic on other plants naturally; and are often grown here hung up in baskets filled with moss, &c.
Eranthemum	Rich light soil	Readily by cuttings.
Eriodendron	Turfy loam	Readily by cuttings.
Eriolæna	Turfy loam	Half ripened cuttings root freely.
Erythrina	Rich loam	Cuttings of the plant root freely.
Eugenia	Peat and loam	Ripened cuttings root readily.
Euphorbia	Sandy loam	Cuttings partially dried will root, and many of the species ripen seed.
Euryale	An aquatic	Seeds may be obtained by assisting impregnation.
Fagara	Loam and peat	By cuttings.
Ficus	Rich loam	By cuttings, and some of the species will emit roots from the leaves.
Flacourtia	Loam and peat	Cuttings will root freely.
Flemingia	Loam and peat	Cuttings will root freely.
Flindersia	Turfy loam	By cuttings.
Gærtnera	Loam and peat	Readily by cuttings.

	Soil.	Mode of Propagation.
Galega	Loam and peat	By seeds and cuttings.
Galipea	Light loam	Cuttings root freely.
Galphimia	Turfy loam and peat	Ripened cuttings root readily.
Garcinia	Light loamy soil	Ripened cuttings will root in sand.
Gardenia	Loam and peat	Half-ripened cuttings strike root.
Gaya	Loam and peat	Half-ripened cuttings root freely.
Geoffroya	Loam and peat	Cuttings will root readily.
Gesneria	Light rich soil	By cuttings.
Getonia	Loam and peat	By cuttings.
Globba	Loam and peat	By dividing them at their roots.
Gloriosa	Loam and peat	Readily by dividing the roots, or by seeds, which ripen abundantly.
Gloxinia	Turfy loam and peat	Readily by cuttings; the leaves planted in clear sand will also make good plants.
Glycine	Loam and peat	Cuttings of the young wood root freely.
Gmelina	Loam and peat	By cuttings.
Gomphia	Sandy loam and peat	By cuttings.
Gomphrena	Rich light soil	Young cuttings root readily.
Gonolobus	Loam and peat	By cuttings.
Goodyera	Vegetable matter	By suckers.
Gossypium	Rich light soil	Half-ripened cuttings root freely.
Gouania	Loam and peat	Ripened cuttings root readily.
Grewia	Loam and peat	By cuttings.
Griffinia	Rich loam	By offsets from the bulbs, or from seeds.
Grislea	Loam and peat	Young cuttings root freely.
Gronovia	Rich loam	Young cuttings root freely.
Guatteria	Loamy soil	Cuttings of the ripened wood root freely.
Guazuma	Loam and peat	By cuttings.
Guilandina	Loam and peat	By cuttings.
Gustavia	Peat and loam	Ripened cuttings root in sand in a strong heat.
Hæmatoxylon	Loam and peat	By cuttings.
Hamellia	Loam and peat	By cuttings.
Hedychium	Light rich soil	Dividing the roots is the mode by which they are increased.
Hedysarum	Loam and peat	By ripe seeds, which are often produced.
Heliconia	Peat and loam	By dividing at the roots.
Heliocarpus	Loam and peat	Cuttings root freely.
Hemionites	Decayed veget. matter	By seeds, and by dividing at the roots, as all other ferns.
Heritiera	Sandy loam	Cuttings of the ripened wood root freely.
Hernandia	Sandy loam	Ripened cuttings, with their leaves entire, root freely.
Heynea	Loam and peat	Cuttings of the ripened wood root freely.
Hibiscus	Peat and loam	Several species ripen seeds, by which young plants are obtained, and others are readily propagated by cuttings.
Hillia	Peat and loam	Cuttings root freely.

	Soil.	Mode of Propagation.
Hippomane	Loam and peat	Cuttings of both old and young wood will root freely.
Hirtella	Loam and peat	By cuttings.
Hoffmanseggia	Peat and loam	Half-ripened cuttings root freely.
Hoya	Sandy loam	Cuttings root in heat; and young leaves stuck in the ground will also form plants.
Hura	Light loam	Cuttings of the ripened wood root freely.
Hymenæa	Loam and peat	By cuttings, but more readily by seeds.
Ichnocarpus	Loam and peat	By cuttings.
Indigofera	Peat and loam	By cuttings and seeds.
Inga	Loam and peat	Young cuttings taken off at a joint root freely.
Inocarpus	Loam and peat	Ripened cuttings root freely.
Ipomœa	Rich light loam	Young cuttings root freely, and seeds are often produced.
Ixora	Sandy loam and peat	Cuttings root freely.
Jacaranda	Loam and peat	Half-ripened cuttings root freely.
Jacquinia	Peat and loam	Cuttings root freely.
Jasminum	Loam and peat	By cuttings.
Jatropha	Loam and peat	By seeds, which often ripen, and also by cuttings.
Jussieua	An aquatic	Easily propagated.
Justicia	Peat and loam	Cuttings root freely in most of the species.
Legerstrœmia	Peat and loam	By cuttings, which root freely.
Lagetta	Loam and peat	Readily by cuttings.
Lantana	Loam and peat	Cuttings root freely in fine sand.
Laurus	Rich loam and peat	Cuttings of the ripened wood strike root, but not without care.
Lawsonia	Loam and peat	Readily by cuttings.
Leea	Light loam	Readily by cuttings.
Limonia	Loam and peat	Cuttings of the ripened wood root freely.
Lisianthus	Loam and peat	Readily by cuttings.
Lobelia	Light rich soil	Cuttings strike freely.
Lonchitis	Decayed veget. matter	By seeds, and dividing at the roots.
Lygodium	Decayed veget. matter	By seeds, and dividing at the roots.
Macrocnemum	Loam and peat	Cuttings root freely.
Mæsa	Loam and peat	By cuttings, which root freely in heat.
Malpighia	Peat and loam	Ripened cuttings will strike root.
Mammea	Sandy loam	Ripened cuttings, with the leaves left entire root pretty freely.
Mangifera	Sandy loam	Seeds are often imported from the West Indies which vegetate readily, but it may be also increased by cuttings in a moist heat.
Maranta	Rich soil	By dividing at the root.
Marica	Loam and peat	By seeds which ripen frequently, and also by dividing at the root.
Melaleuca	Sandy peat and loam	Cuttings root pretty freely.
Melastoma	Sandy peat	Young cuttings root readily.
Melhania	Loam and peat	By cuttings, which root freely.

	Soil.	Mode of Propagation.
Melia	Loam and peat	Seeds often ripen, and cuttings will strike, if not too young.
Melicocca	Light loam	By cuttings.
Melodinus	Loam and peat	Cuttings strike root readily.
Michelia	Loam and peat	Ripened cuttings root freely, and it also takes if inarched on the *Magnolia purpuria*.
Mimosa	Peat and loam	Some species ripen seeds, and others are increased by cuttings.
Mimusops	Loam and peat	Ripened cuttings root readily.
Monelia	Loam and peat	By cuttings.
Morinda	Loam and peat	By cuttings.
Muntingia	Loamy soil	Readily by cuttings.
Musa	Rich loam	Readily by suckers.
Mussænda	Loam and peat	Cuttings will root freely.
Myginda	Loamy soil	By cuttings.
Myrodia	Light rich soil	By cuttings of the young wood.
Myrtus	Rich light loam	By layers, although some of the species will root by cuttings. Seeds, when they can be obtained, are to be preferred.
Nauclea	Loam and peat	By cuttings.
Nelumbium	An aquatic	By dividing the roots, but more abundantly by seeds.
Neottia	Turfy peat	Only by dividing the roots.
Nephelium	Rich loam	Cuttings root freely.
Nephrodium	Decayed veget. matter	By seeds, and by dividing at the root, like all other ferns.
Nerium	Peat and loam	Cuttings root freely.
Nissolia	Loam and peat	Cuttings root freely.
Nyctanthes	Loam and peat	Half-ripened cuttings readily strike root.
Nymphæa	An aquatic	By dividing the roots.
Ochna	Loam and peat	By cuttings.
Ochroma	Loam and peat	Cuttings root freely.
Oldenlandia	Rich loam	Cuttings root freely.
Olyra	Rich loam	By dividing the roots.
Omphalea	Loam and peat	Cuttings having the leaves left entire root readily.
Oncidium	Parasitic	By dividing at the roots.
Ormosia	Loam and peat	Seeds are often procured from the West Indies by which they are increased; it will, however, also strike from cuttings.
Ornithrophe	Light loam	Cuttings root readily.
Osbeckia	Peat	Cuttings of the young shoots root freely.
Oxyanthus	Sandy loam and peat	Readily by cuttings.
Oxystelma	Loam and peat	By cuttings.
Pæderia	Loam and peat	Cuttings root readily.
Panax	Loam and peat	Readily by cuttings.
Pancratium	Rich loam	By seeds or suckers, which are almost annually produced.

	Soil.	Mode of Propagation.
Pandanus	Rich loam	The only means of increase in this country appears to be from suckers, and these are not often produced.
Parkinsonia	Loam and peat	By seeds, which are often imported, and also sometimes by cuttings.
Passiflora	Rich loam and peat	Cuttings, and if attention be paid to assist impregnation, new and curious hybrides may be produced.
Paullinia	Loam and peat	Cuttings root freely.
Pavonia	Light soil	Cuttings root freely.
Pedilanthus	Light sandy soil	Cuttings root freely, if put into the bark-bed instead of mould.
Peliosanthes	Turfy loam	By dividing the roots.
Pentapetes	Light rich soil	Cuttings readily root.
Periptera	Light rich soil	Cuttings of the young wood root freely.
Persea	Turfy loam	Generally by layers.
Petiveria	Light rich soil	Cuttings root freely.
Petræa	Loam and peat	Cuttings root freely.
Pharus	Light loam	By dividing at the root.
Phœnix	Rich loam	From seeds only. The dates of the shops often vegetate, and, by that means, *P. dactylifera*, is increased.
Phrynium	Rich loam	By dividing at the roots.
Phyllanthus	Loam and peat	By cuttings.
Phylloma	Sandy loam	Only by suckers.
Phytolacca	Loam and peat	By seeds and cuttings.
Picramnia	Loamy soil	Cuttings of a large size root better than such as are small.
Piper	Loam and peat	Very readily by cuttings and suckers.
Piscidia	Sandy loam	Cuttings are sometimes rooted, by which plants are obtained.
Pitcairnia	Sandy loam	By suckers from the roots.
Plukenetia	Light rich loam	By cuttings.
Plumbago	Peat and loam	By cuttings.
Plumeria	Light rich soil	Cuttings of a large size root best.
Poinciana	Loam and peat	By seeds.
Polypodium	Any light soil	Multiplied, like all ferns, by seeds, and by dividing at the roots.
Pongamia	Loam and peat	By cuttings.
Pontederia	An aquatic	By dividing at the roots.
Polyspora	Loam and peat	Half-ripened cuttings root readily.
Portlandia	Loam and peat	Cuttings, having their leaves left entire, root best.
Pothos	Light turfy soil	By seeds, and by dividing the plant.
Prestonia	Loam and peat	Cuttings root freely.
Priva	Loam and peat	Cuttings root freely.
Psidium	Rich loam	By layers, but will also root from cuttings, which produce the best plants.

	Soil.	Mode of Propagation.
Psychotria	Loam and peat	Cuttings root readily.
Pteris	Any light soil	By seeds, or by dividing at the roots.
Pterocarpus	Light loam	Cuttings, having their leaves left entire, root freely.
Pterospermum	Rich loam	Cuttings, having their leaves left entire, root freely.
Quassia	Loam and peat	Cuttings of the ripened wood root freely.
Quisqualis	Peat and loam	Cuttings root freely.
Rajania	Rich loam	By dividing the roots.
Randia	Loam and peat	Cuttings root freely.
Rauwolfia	Loam and peat	Cuttings root freely.
Rhapis	Sandy loam	By suckers from the roots.
Rhexia	Sandy peat	Cuttings of the young wood root freely.
Rhipsalis	Sandy loam	Readily by cuttings.
Rhopala	Sandy loam	Cuttings strike root freely.
Richardsonia	Loam and peat	By cuttings.
Rivina	Loam and peat	By seeds or cuttings.
Robinia	Peat and loam	By seeds or cuttings of the young wood.
Rolandra	Rich light loam	Readily by cuttings.
Rondeletia	Loam and peat	Cuttings root freely.
Roscoæa	Turfy loam	By dividing at the root.
Roxburghia	Loam and peat	By dividing at the root.
Rubus	Light rich soil	By suckers, cuttings, or seeds.
Ruellia	Light rich soil	By cuttings.
Ruizia	Peat and loam	By cuttings.
Russelia	Light rich soil	Readily by cuttings.
Sabal	Sandy loam	Occasionally by suckers.
Saccharum	Rich loam	By suckers.
Sagus	Sandy loam	Occasionally by suckers.
Salvia	Peat and loam	Most readily by cuttings.
Samyda	Loam and peat	By cuttings.
Sanseviera	Sandy loam	By suckers.
Santalum	Light loam	By cuttings.
Sapindus	Loam and peat	Large cuttings root more freely than small ones.
Sapium	Loam and peat	By cuttings.
Sarcocephalus	Turfy loam	By cuttings freely.
Schinus	Peat and loam	Ripened cuttings root freely.
Schotia	Peat and loam	By cuttings, but not readily.
Scopolia	Loam and peat	By cuttings.
Secamone	Loam and peat	Cuttings root readily.
Securidaca	Loam and peat	Cuttings root freely.
Selloa	Light rich loam	Cuttings of the young wood root very readily.
Seriana	Sandy loam	By cuttings.
Sesbana	Loam and peat	By cuttings.
Sida	Peat and loam	As seeds of them are often produced in this country, young plants are easily obtained.
Siderodendrum	Peat and loam	Cuttings will root, but require time.
Sloanea	Loam and peat	Ripened cuttings root freely.

	Soil.	Mode of Propagation.
Solandra	Peat and loam	Most readily by cuttings, either of the young or old wood.
Solanum	Peat and loam	Cuttings of most of the species strike freely.
Sophora	Peat and loam	By cuttings.
Spermacoce	Peat and loam	By cuttings.
Spilanthes	Rich light soil	Either by seeds or cuttings.
Spondias	Loam and peat	Large pieces of the shoots made into cuttings, root freely.
Stachytarpheta	Rich soil	Cuttings strike root freely.
Stapelia	Lime rubbish	Cuttings root most freely, but require to be partially dried before planting.
Starkea	Peat and loam	By cuttings.
Stelis	Turfy peat	By dividing them at the roots.
Sterculia	Light loam	Cuttings of the ripened wood root freely.
Stilago	Light loam	By cuttings.
Stillingia	Loam and peat	By cuttings.
Strelitzia	Light sandy loam	Seeds are obtained by assisting the impregnation, from which plants are obtained, and rooted suckers are often to be had from the old plants.
Strophanthus	Peat and loam	Cuttings of the young wood root freely.
Swietenia	Peat and loam	Ripened cuttings root, but not freely.
Tabernæmontana	Loam and peat	By cuttings.
Tacca	Peat and loam	By suckers from the roots.
Talinum	Sandy loam	Cuttings root freely.
Tamarindus	Loam and peat	By cuttings and seeds, which are often imported.
Tecoma	Rich loam	By cuttings of the roots, and by cuttings of the young wood.
Tectona	Loam and peat	Ripened cuttings root freely.
Terminalia	Sandy loam	Ripened cuttings root freely.
Tetranthera	Light loam	Cuttings of the ripened wood root freely.
Theobroma	Light rich soil	By cuttings.
Theophrasta	Sandy loam	Cuttings, with their leaves entire, will root freely.
Thunbergia.	Loam and peat	Readily by seeds and cuttings.
Tillandsia	Parasitical	By suckers.
Tournefortia	Rich loam	Cuttings root freely.
Tradescantia	Sandy loam	By seeds, and by dividing at the roots.
Trevirana	Sandy loam	By dividing the roots.
Trewia	Loam and peat	Cuttings root freely.
Trichilia	Loam and peat	Cuttings root, if kept in a good heat.
Triopteris	Sandy loam and peat	Ripened cuttings will root readily.
Triphasia	Turfy loam	Half-ripened cuttings root freely.
Triumfetta	Loam and peat	By seeds and cuttings.
Turnera	Light loam	By seeds and cuttings freely.
Unona	Light loam	Ripened cuttings root freely.
Urania	Rich loam	By seeds, which are often imported, and it will sometimes produce suckers.

	Soil.	Mode of Propagation.
Urena	Loam and peat	By seeds, and also by cuttings.
Uvaria	Sandy loam	Ripened cuttings strike root in a good heat.
Vanda	Parasitical	By cuttings.
Vanguiera	Sandy loam	By cuttings.
Vanilla	Parasitical	Readily by cuttings.
Verbesina	Loam and peat	By cuttings.
Vinca	Peat and loam	By cuttings.
Vitex	Peat and loam	By cuttings.
Volkameria	Loam and peat	Cuttings root readily.
Waltheria	Loam and peat	Cuttings strike root freely.
Witheringia	Loam and peat	Propagated by cuttings of the young wood.
Wrightia	Peat and loam	By cuttings of the half-ripe wood.
Xanthochymus	Light loam	Half-ripened cuttings succeed best.
Ximenia	Loam and peat	By cuttings.
Xiphidium	Loam and peat	By dividing at the roots.
Xylopia	Sandy loam	Ripened cuttings succeed best.
Zamia	Sandy loam	Some of the species by dividing at the root, and others by small knobs which grow on the principal roots.
Zanthoxylum	Sandy loam	By cuttings.
Zingiber	Loam and peat	By dividing them at the root.
Zizyphus	Loam and peat	By cuttings.
Zornia	Light rich soil	By cuttings.

NURSERY AND PLANTING.

INTRODUCTION.

The term nursery, when applied to matters relating to horticulture, is understood to refer either to the commercial or public nursery, wherein are cultivated trees, plants, and oftentimes seeds, for the purpose of sale; or to the private nursery, in which trees and plants are propagated and reared by the proprietor, for the purpose of enriching or beautifying his park or domain, or for extending his plantations with a view to ultimate profit, and increasing the value of his estate. The spirit for planting has very much increased in this country within the last sixty or seventy years; and we find during that period, that the minds of men conspicuous for their learning, and admired for their virtues and patriotism, have been enthusiastically attached to this pursuit, and the beneficial effects of their labours are, and will remain, monuments of their good policy, long after they themselves have "reached that bourne from which no traveller returns."

The beneficial effects of planting have long ago been sufficiently demonstrated to be attended with a certain and progressive increase of any given capital employed in it, and considered either individually or generally, must, in most cases, reward the speculator, although at a more remote period, with a far more certain return than almost any other speculation in which he can embark. Considered as a national advantage, planting must rank high in the list of improvements, and be indispensable in such countries as our own, the glory and independence of which depend so much on the strength of our navy and extension of commercial shipping. Our boasted oaks have been the envy and dread of our enemies, and the bulwarks of our safety, when invasion was threatened by the combined powers of almost the whole of

Europe. We are informed by Evelyn, the celebrated author of Sylva, that the commanders of the Spanish Armada had positive directions, that if, when landed, they should not be able to conquer this country, they were not to leave a tree standing in the forest of Dean, thinking that, by destroying that national forest, to weaken our maritime means of defence, and render us an easier prey to a future invasion. Britain has always been plentifully stocked with timber, and abounded, till the time of the civil wars, with natural forests of great extent; for we learn, at the time of the compilation of Doomsday-Book, that timber was not valued by measurement or quality; but the forests by the number of swine that could be maintained on the acorns and mast which they produced. And a writer in the time of Edward the Fourth, about four hundred years after that period, says, that England was then a well-timbered country.

It does not appear that previously to the beginning of the seventeenth century that planting was much attended to as a matter of rural economy, although it is certain that, for particular purposes, and in certain situations, a considerable number of trees must have been planted long before that period. Between 1538 and 1616, we meet with several authors on the subject of planting, and the management of forest and copsewoods; and, as an anecdote connected with the horticultural literature of this country, we may be excused for the following digression.

In 1538, Benose published a work on timber and planting, which was followed by another by Fitzherbert, in 1539; and in 1607 appeared Sir John Norden's Surveyor's Dialogue. In 1612 was published, "Of planting and preserving of timber and fuel, an old thrift newly revived by R. C."; and in 1613, the year following, that by Arthur Standish, entitled, "Direction for planting timber and fire-wood." In Googe's Husbandry of 1614, Planting for timber and copse is particularly noticed; and Manwood's "Treatise on Forests, and their original and beginning," appeared in 1615; and that of Rathbone's Surveyor in 1616. At so early a period it is something singular, says an intelligent writer, there should appear so many works on a subject then so little generally

attended to. Professor Martyn conjectures this circumstance to have arisen from the general attack made on the forest-trees in the twenty-seventh year of Henry the Eighth, when that monarch dispersed the religious houses, and seized on the church lands; for after this time, we find the consumption of oak timber to have greatly increased, not only in consequence of the extension of commerce, but of the great additions to the royal navy, and the more general adoption of that timber in the building of houses, &c. For as Holinshead, who lived in the succeeding reign, observes, "in times past, men even were contented to live in houses built of sallow, willow, &c., so that the use of oak was in a manner dedicated wholly unto churches, religious houses, princes' palaces, navigation, &c., but now nothing but oak is any where regarded."

The publication of Evelyn's Sylva may be considered the grand impetus which exhibited a spirit for planting in this country, and the establishment of forest-tree nurseries which followed (during the seventeenth century), as a matter of course facilitated its progress, the most antient of which, it may be observed, was that of Corbett, at Twickenham, and that of Loudon and Wise, at Brompton Park, which is still so respectably kept up. Individuals about this period saw the advantage of planting, and, breaking through the trammels of ignorance and sloth, commenced planting timber-trees, many of which still exist as monuments sacred to their memory. Before the establishment of nurseries, as above stated, such trees as were planted were procured from the natural forests and woods, and were those which accidentally sprang from seed.

The encouragements held forth by the Society of Arts, which was established about the middle of the eighteenth century, contributed in a very important degree to promote a spirit for planting and the improvement of landed property. This planting became fashionable, and being noticed and patronized by the great, soon made rapid strides in improvement. The appearance of the Sylva, edited by Dr. Hunter, became a second stimulus; and the examples and precepts of Kennedy, Young, Marshall, and Pontey, as authors and practical men, together with the encouragement from such men as the Dukes

of Argyle, and Athol, Earls of Haddington, Bute, Loudon, &c., and latterly from almost every country gentleman both in England and Scotland, that planting has now attained a position amongst the liberal sciences, that renders it a pleasing, profitable, and honourable employment to the great, and a source fraught with considerable advantages to the poor, whose state is ameliorated by the employment it affords, and the means of affording not only comfortable dwellings, but also abundance of fuel, which is sufficiently appreciated in those countries, where coal is either dear or not to be obtained. The effect which planting has in the improvement of our climate is sufficiently obvious to the most superficial observer, and the improvement of the general appearance of the surface, in a picturesque point of view, cannot but awaken pleasing associations in the mind of every man, who is not, like the great lexicographer, predetermined to hate every thing vegetable, and who can travel from Dan to Bersheba without once seeing beauty in a single tree.

Agriculture is improved by the shelter afforded by plantations both to the cattle and grain crops, and evidently derives much assistance from the facility which they afford of subdividing property and fields. Architecture, both civil and military, has never to dread a want of materials, while that spirit is fostered and promulgated; but a neglect of it would be fatal to both, and the effects of a decay in our maritime power, would, in all probability, end in the subjugation of our freedom as a great and free people, and probably the blotting out of our name as the greatest of all nations.

FORMATION OF A FOREST-TREE NURSERY.

Proprietors who intend to improve their estates by planting, should, and many have proved the truth of the assertion, rear their own timber-trees from seeds, upon their own property, if their intention be to plant extensively, not only as an object of economy, but also as a matter of convenience. This doctrine has met with the most strenuous opposition, and many discouraging obstacles have been held out to those who purposed to adopt it. But it should be remembered that that op-

position was made by those, who considered their own private interests and emoluments to be at stake. Times are now much changed, and men see, and are disposed to act more liberally in this respect; and we find most of our great planters originating their own trees for their own use, notwithstanding that they can be, in many cases, purchased cheaper from the commercial nurserymen than they can be reared by the proprietor. This was not the case twenty or thirty years ago, and at that period, a vast annual sum passed from the hands of the planter to the nurseryman; and, as a consequence which might be expected, opposition and party-spirit followed, and in the end trees could be purchased at nearly 50 per cent. cheaper than they were formerly sold for.

This may be attributed to a class of needy men, who, taking the advantage of the planting mania, established themselves over the country, and by underselling the regular and respectable nurserymen, who had both credit and honor at stake, reduced the confidence of land-owners in them to that ebb, that for a time lands were planted by those who presented the lowest estimate. A system of this description was productive of both good and evil, for, in the first place, it acted as a stimulus to the more expeditious propagation of trees, and consequently of affording them to be sold at a much lower price, and this has ever since continued to be the case. But, upon the other hand, the evil which followed, was the total disappointment of those proprietors who planted upon this cheap system, as few of them, after several years planting and re-planting, had, in the end, a *tithe* of the trees so planted on their land. Disappointed in this manner, many established private nurseries of their own, and by degrees were able to supply their own demand; and where these were conducted on good principles, the result was highly satisfactory to themselves and an example which others followed. Such may be considered as the origin of private nurseries.

While the high price of trees continued, many landed proprietors were deterred from planting so extensively as they intended, in consequence of exorbitant charges; and when the low prices became prevalent, and a certain class of nurserymen became cheap contractors, not only for the supply of the plants,

but also for the planting, and, in many cases, for the enclosing and draining of the land, another evil followed, and of far worse consequences, namely, that the ground, in many cases, was not half planted; bad trees were used, and sorts unfit for the various soils operated on, were injudiciously planted where they should not have been; and, to crown the whole, sorts were planted which were in the greatest abundance, either in the estimation or stock of the contractor, without any regard to the interest of the proprietor, who, after a number of years of anxious expectation of having fine healthy plantations stocked with the trees of greatest value, found that he had his soil cumbered with Scotch fir, and probably larch, without a single oak or ash on an acre.

Before proceeding further, we beg most distinctly to be understood, that these remarks are not levelled indiscriminately at nurserymen in general, but to those who, by selling at a lower price than can cover the expense of rearing the trees in a proper manner, are without principle induced to adopt measures to ensure a sufficient profit for themselves, at the proprietors' expense and disappointment. Against these men, landed proprietors cannot be too sufficiently guarded. From our own knowledge, there are few professions in life wherein a greater number of respectable, honest, and honorable men are to be found, than in that of nurserymen; but in this, as in all others, there are some of the above description, always ready to contract to plant and supply at prices which no discrete man can afford to do, without entailing upon himself a serious loss either of capital or credit. These are our views of the foundation of private nurseries in general, although some few proprietors, for the gratification of peculiar fancies, have and still continue to rear their own trees; still by far the greater number have been induced to do so to prevent disappointment and imposition.

Proprietors who intend to plant should either rear their own trees under the direction of their gardener or forester, or else purchase them at once from a respectable commercial nurseryman, and have the planting executed by labourers on their own estates, and under the direction of a person competent to the charge. There is no part of forest-tree planting that should be

let by the task or piece, excepting it be the cleaning, draining, trenching of the ground, and the digging the pits for the trees. The very best trees should be chosen, and as good trees cannot be reared but at a very considerable expense, a liberal price should be given. Many, however, thinking to act with great economy, purchase their trees from itinerant nurserymen, and from such as offer plants at an unreasonably low price; such persons, therefore, may to a certainty expect to be disappointed. It should also be considered, that in regard to trees, as is the case in all other marketable commodities, there are high and low prices fixed, according to the value of the goods. When a liberal price is offered, good trees can always be procured; and we are confident that every respectable nurseryman feels more satisfaction at sending out good plants to his customers than bad ones; and we are also confident that good trees from the nursery, although high in price, are always much cheaper in the end than bad ones, which are got for nothing.

Local situation has also some effect in inducing our recommendations of private nurseries, for when trees are brought a great distance, the expense must be considerable, and the injury that they sustain no less so, from being a length of time out of the ground. In many sequestered situations, particularly in the north of Scotland, in Ireland, and Wales, where planting may be in progress, many unforeseen obstacles may delay the arrival of trees at their destination, several weeks after they have been taken up in the nursery; and, in these cases, a considerable number of trees are generally ordered at the same time, many of which often remain unplanted for three months; laid (as it is technically called) in by the heels, and not unfrequently in bundles of from five hundred to a thousand trees each, closely tied together. There are few places where it is difficult to procure plenty of men to assist in planting, but we have always found it better to continue the season of planting to a greater length of time, than to employ too many hands, many of whom never planted a tree before in their life. For these, and other reasons of an equally important nature, we would recommend the forming private nurseries near to where the scene of planting is to take place, as, by that means, the trees may be taken up accordingly as they are wanted; and it is reasonable to expect that

such trees will be much more likely to succeed, than if they were carried five hundred miles, and kept five or six weeks out of the ground.

It has been advanced by many practical men, and, as Sang observes, "Many are of that opinion still, that trees, in order to their being rendered sufficiently hardy, should be reared on the soil, and in the situation where they are ultimately to be planted; or at least in a soil and situation as nearly similar as possible." We know that this plan has been extensively practised by those who are engaged in the extensive plantations carried on in the Forest of Dean, and other places, with the best effect; but, as the intelligent author above-mentioned, further observes, "If the soil and situation in which the trees are ultimately to be planted, be favorable, we can see no solid reason for objecting to such a plan, particularly if the design be extensive, and such as may require many years for its completion; because a conveniently situated nursery is, in that case, highly desirable, not only as saving the carriage of plants, and faciliating the business of transplanting, but as increasing the chance of success, on account of the plants remaining a much shorter time out of the ground than if brought from a distance. But if the situation ultimately designed for the trees be cold, high, and bleak, and the soil of course various, some good, and much of it bad, or of an indifferent quality, *there* it would, by no means, be advisable to attempt the establishment of a nursery, and especially a nursery to raise plants from seeds."

In the formation of a complete nursery, it is almost indispensible that the soil be of various qualities; and when this is not naturally the case, it must, to a certain extent, be made so by artificial means. But as natural soils are to be preferred, some care ought to be taken in the selection; and, as it is somewhat different in this case from that of a kitchen or fruit-garden, where it would be extremely inconvenient to have it in detached pieces, we cannot see any objection to have several small nurseries instead of one large one, if the natural character of the soils be sufficiently various to admit of this arrangement. Thus a moist piece of ground might be enclosed for peculiar species, a piece of bog or peat soil for others, and one of land of a light loamy texture for a third. Strong, rich alluvial soils, we con-

sider would, in many cases, be too good for rearing forest-trees in, although extremely well calculated for that of fruit-trees and many kinds of shrubs. A poor barren heath, with sufficiency of peat earth on the surface, on which heath, *Erica vulgaris*, &c. grows luxuriantly, or a soil of decayed vegetable remains, denominated peat, although rather moist, would be a suitable nursery for the majority of American trees and shrubs; light friable, or light sandy loam, would be well calculated for forest-trees in general.

In regard to the depth of soil, we may say from one to two feet, are sufficient for the generality of plants, but none, if it can be avoided, should be less than one foot; and, as the first step towards its formation, draining, if it be necessary, and enclosing in all cases, should be first and strictly attended to. Young trees will not succeed, with a few exceptions, in wet ground, nor can seeds ever be expected to vegetate in it, although the very plants that spring from them may, at a future period, prosper to the extent of our wishes in very moist situations. Water, if possible, should be retained in tanks or small ponds, if it exist in the ground, but if not, it should be brought in pipes, or by other means, as, at the season of planting, and sometimes during dry summers, it is almost indispensable. In regard to enclosing, it is of the first consequence, not only sufficient to guard against the inroads of cattle, &c., but against the no less destructive quadrupeds, the hare and rabbit, which it is difficult to exclude, and which are very destructive to almost every species of tree in their young state. In countries where stone is abundant, walls of five or six feet will be more durable and impenetrable; and where such materials are not naturally to be had, pales of oak, or other durable timber, should be substituted; in the latter case, the ends of the pales should be let in a foot at least under the surface, for the better exclusion of rabbits. Where nurseries are intended for the exclusive purpose of rearing forest-trees, any artificial shelter is probably unnecessary, and is, when too much indulged, injurious; but such as are for the purpose of cultivating more delicate plants, shrubs, or fruit-trees, some attention ought to be paid either to select a sheltered spot, or to provide shelter by planting, &c.

A nursery in a private establishment may, with much propriety, answer the two-fold purpose of a nursery and auxiliary kitchen-garden; and, by a judicious arrangement of rotation of crops, would be beneficial to both. The ground which has been under forest-trees two, three, or more years, is, with the addition of a little manure, in excellent condition for the majority of culinary vegetables; and the cultivation of them in their turn, renders the soil in good condition for seed-beds, or for transplanting seedling-trees. We should observe, however, that potatoes should not precede a crop of seedling-trees, as it is with great difficulty that all of them are got out of the ground when the crop is removing, and those which are left will shoot up in the spring, and their removal will seriously injure the seedling-trees. Peas that have not been staked, but allowed to lie on the ground, are a good preparatory crop for seedlings, as they tend to clear the ground of weeds, by smothering them during summer. Carrots, onions, and similar crops, particularly the former, are excellent preparatory crops; the necessary hoeing or weeding also cleans the ground.

By a rotation of this sort, nursery ground will seldom require trenching after its formation, as a constant change of crops, with slight manurings, will be always sufficient. In regard to the rotation of crops, Sang has the following excellent remarks, which, although differing from our own opinion and practice in the exclusion of carrots as a preparatory crop, we give it with pleasure, and with all due deference, knowing, as we do in this instance, that we differ in opinion from one who has had such extensive practice in this branch of rural economy, and from whose writings we have derived much information. "There is one kind of crop," he observes, "which we judge peculiarly scourging for a nursery, and that is carrots; they are indeed rather severe for most lands, but we have seldom found a good crop of trees following one of carrots, while we have found peas, beans, and especially lettuces, easy and enriching crops, well adapted as preparers for succeeding crops of nursery articles. In so far as regards public nurseries, we had long remarked that those which partake as much of the character of market gardens as nurseries, generally produce the best seedlings, and young articles for sale, provided that the ground be

any thing more than of a middling quality. This fact, if one were wanting, is a sufficient proof of the utility of occupying the ground as above advised, in the double character of a kitchen-garden and nursery."

The foregoing remarks are applicable only to such nurseries as are within the park, or contiguous to some part of the domain, and in which sufficiency of young stock may be reared for the most extensive plantations. A few hints may be here useful in regard to nurseries at a greater distance from home, and intended for containing the trees, from the time of their being put out in nursery lines to their final transplantation. The situation of such nurseries is generally on or near the spot intended to be planted, and are not to be considered as of so permanent a nature as the home-nursery already noticed. A somewhat sheltered spot should also be chosen for this kind of nursery, and the soil, though poor, should be easily worked, in order to facilitate the operations of hoeing and cleaning. It is also of much consequence that such a spot be enclosed, sufficient at least to keep out cattle, if not hares and rabbits also. Here the young trees brought from the home-nursery, when fit to transplant into nursery lines, or to bed out, should be cultivated, till of sufficient size to plant out permanently. The preparation necessary for such a piece of ground consists in draining and trenching, or deep ploughing, which latter operation should be performed at least three times during the summer previously to planting, and be repeatedly harrowed, to break the surface sufficiently fine to receive the young seedling plants. Shelter may be obtained to such a nursery, first, by the selection of a spot naturally sheltered by rising grounds and fully exposed to the sun; or, secondly, by planting quick-growing hedges, both as a boundary fence, and also for subdividing the enclosed space into convenient departments. The sorts of trees best calculated for these fences, are poplar of any sort, spruce, fir, elder, or privet. Larch has often been used for this purpose, but is justly condemned by Sang and other nurserymen, as being liable to be overrun with the *Coccus larixea*, an insect peculiar to this tree, and which not only destroys those which might be used for shelter, but would, to a certainty, infect the young plants of that tree in the nursery lines. Spruce

being evergreen, is, of all others, the best calculated for this purpose, as affording shelter in winter and spring, when it is the most required.

Unless the ground be very poor indeed, we would say that manure was unnecessary for such a nursery as that in view; but if it be considered rather poor, lime, chalk, or marl, would be beneficial; and, indeed, we think either preferable to animal manures of any kind, in almost all cases, for nurseries.

In the subdivision of nursery grounds, it is essentially necessary that walks be introduced, not only for the purpose of dividing it into regular quarters or pieces, but also for the convenience afforded by them, of enabling the owner or operatives to get to the different parts without difficulty, and without injury to the crops. A broad walk, sufficient for a cart, should surround the whole extent, and also intersect it at convenient distances, to facilitate the bringing in of manure, and the taking out the trees, &c.

PRELIMINARY OBSERVATIONS.

In offering the following remarks on the rearing and planting of trees, it may be necessary to observe, that the subject being so interesting, and embracing such a variety of objects, it cannot be so amply detailed in the following pages as could be wished, in consequence of the necessity of our being confined to certain limits; we will, therefore, endeavour to restrict ourselves to those parts of their culture which are most conducive to success, and chiefly treat on those parts most likely to be of use to the practical man.

In the arrangement of the matter, we shall consider each individual genus under separate heads, and adopt the alphabetical order of their names, as being the most perspicuous, and presenting greater facility of reference. It shall also be our endeavour to point out the soils suitable for each; their mode of originating, whether by seeds, layers, cuttings, &c.; their nursery culture, and their final transplantation; offering occasionally any thing new, curious, or interesting in their physiology, size, &c.

ACACIA.—(See *Locust-tree.*)

ALDER.—(*Alnus.*)

The common Alder (*Alnus glutinosa*) is a native of Britain, and abounds naturally in wet boggy soils, and by the sides of rivers and lakes. It is, however, found to grow upon soils that are high and even dry, but not with that degree of luxuriance that it attains in soils of a moist nature. It seldom succeeds in chalky or calcareous soils; indeed, in such it can scarcely be said to live. It is well calculated to plant by the sides of rapid running streams, or large rivers, as from the multiplicity of its roots, which also extend a great way, it is of much use in binding the banks together, and preventing them from being carried away by the stream.

Alder is a tree easily propagated, succeeding well by cuttings of a large size planted in spring, where it is intended they are to remain, or, in common with almost all trees, from seeds, which vegetate freely if sown in a rather moist soil. The seeds ripen in October, and should then be gathered, making choice of a dry day for the purpose, which should be invariably attended to in all cases of seed-gathering, as entailing less trouble in drying them, and guarding against damaged seeds. The seeds are extracted by laying the cones upon a floor in a dry loft, and by frequently turning them, the seeds will fall out; or the cones may be thrashed, and the seeds separated by sifting. When cleaned, they should be kept in sacks till the spring, when they may be sown in March or the beginning of April. In preparing the ground for alder-seed, care should be taken to render it smooth and even, as the seeds are small and liable to be buried too deep; the beds should be four feet wide, and of the length of the quarter or piece of ground, or less if required. In regard to the quantity of seed to a given space of ground, it would be difficult to determine, as, like some other forest-tree seeds similar to it, it is difficult to ascertain the real quality of alder-seed; however, it is always better to sow thick in such doubtful cases, in order to ensure a crop. Alder-seeds are by some sown in autumn, as soon as

gathered, but this is not advisable, as they are very liable to be injured by the vernal frosts; and, independently of this risk, nothing in point of strength is gained by the plants. As the soil for sowing alder-seeds should be rather damp, the young plants are often liable to be thrown out by frosts during the winter, care, therefore, should be taken when this is likely to occur, to deepen the alleys or footpaths between the beds, in order to allow the superfluous water a free channel for passing off; and as a further means of preventing this evil, tanners' bark very much decayed, or rotten saw-dust may be sprinkled over the surface, but if this can be avoided, so much the better, for neither adds to the fertility of the soil, and unless very much decomposed, is evidently injurious to it.

Alders, when one year old, that is, the plants which were originated from seeds in spring, should be gone over the following spring, and all the strongest plants taken carefully up, so as neither to injure themselves nor the remaining crop of weaker seedlings, which are left in the seed-bed to gain strength for another season. Previously to the plants being taken up, the ground should be got ready, into which they are to be transplanted out to nurse. In choosing ground for this purpose, a loose and rather a moist sandy or boggy soil should be preferred. But a strong clay, or dry burning gravelly or sandy soil should be invariably rejected, as being alike uncongenial to their welfare. When the ground is prepared, they should be set out at twelve inches between the lines, and four or five between the plants. For plants of two years' growth, that is, those which were left in the seed-bed one year longer than the above, more room should be allowed them, and they should not be planted closer than fifteen inches between the lines, and six inches from plant to plant in the lines. This latter distance should also be allowed to those one-year old seedlings which are intended to remain two years in the nursery-lines. The routine of after-culture consists in keeping the ground perfectly clear of weeds, as nothing impoverishes the ground so much as allowing them to grow unmolested, and not only their robbing the plants of their due share of nourishment, but in cases where this is not strictly attended to, the plants are literally smothered with them. Of this we had last

year a very striking instance in regard to a very considerable piece of ground occupied by the plant in question, when we took the charge of a very extensive nursery of forest-trees, where the weeds were allowed to gain such a head that the scythe had to be employed to keep the coarse grasses and weeds as low as the tops of the trees; the consequence of which was, that out of fifty or sixty thousand alders that had been planted, not more than as many hundreds could be gathered out of the whole, and, independently of the loss of the trees, the ground had to be trenched and otherwise managed, as if it had never been in a state of cultivation. Hoeing, if taken in time, is a very simple process in horticulture, and if soon done, and well done, is easily done; but, notwithstanding this is acknowledged by every cultivator, it is strange to see how little it appears to be practised.

Alders, after standing from two to three years in nursery-lines, are very fit for final transplanting; but, if left longer than three years, they should be taken up and replanted in lines, at double the distance. This tree, like many others, will succeed well if planted young; and, in such cases, will make good progress if kept clear of weeds. But it possesses this advantage over many others, that it will transplant with safety when of a large size. The banks of rivers, and low swampy soils, where only it should be planted, are very liable to be covered with luxuriant vegetation; therefore, before planting young trees of this sort, the ground should be properly cleared and kept so till the trees become established, and above the reach of danger. Where this is not convenient, and we know there are many instances of that kind, larger trees should be used; and if carefully planted, will succeed as well as those planted younger, and where much expense has been incurred in trenching and manuring the soil.

This tree, under the most favorable circumstances, attains only a middle size; it is deciduous, and sometimes assumes rather a picturesque outline; is of rapid growth, when properly situated, and affording a considerable bulk of fuel, if managed in the copse manner, that is, cut over at stated periods. The timber is not reckoned valuable, but is used by turners, &c., and by carpenters, for roofing and flooring tem-

porary buildings. It has considerable claims to merit for durability in wet situations, and is therefore much used for supporting the roofs of coal and iron-mines, and also for embankments by the sides of ponds and rivers. The bark contains a considerable degree of astringency, and is used in the process of tanning leather, and by the native highlanders, in dying their *tartan* and other woollen stuffs. Charcoal is made of the wood, which is considered excellent in the manufacture of gunpowder. According to Evelyn, the oldest boats we read of, Noah's Ark excepted, were made of this wood; and this appears confirmed, by the following line of Virgil:—

"And down the rapid Po light alders glide."

Vitruvius asserts, that the morasses round Revanna, in Italy, were piled with this wood, to support the foundations of their buildings.

Of this genus, there are eleven species enumerated in the Hortus Brittanicus, nine of which are natives of Europe, and two of North America. There are none of them but can be readily propagated by cuttings, and the most of them by seeds; nor are they cultivated with us with any view to utility, no farther than being considered ornaments to the park, lawn, or shrubbery.

Ash.—(*Fraxinus.*)

The common ash, *Fraxinus excelsior*, is a native of Britain, and is always found in the greatest perfection on dry loamy soils; and although its growth is, in such situations, less rapid than when in moist damp soils, it attains in them a greater age, and ultimately a larger size, and the wood is much more valuable. In wet soils, although, while young, it appears to be healthy and vigorous, still it will decay before it attains a useful size. In over rich soils the wood is seldom good, being short and brittle, but in sandy soils it is tough, and therefore of much more value. Strong clays are, of all others, the least calculated for its growth.

A prejudice appears to exist, by which the ash is almost excluded from forming a part of park scenery, some objecting to it

on account of its lateness in coming into leaf in the spring; others because it sheds them too soon, and others deny it any elegance of outline, with many more objections to which it appears to be unfortunately liable; be this, however, as it may, it is evident that this prejudice has existed for ages, for in general there are few trees of this kind to be met with in parks, where the other timber-trees appear to luxuriate.

The ash is propagated by seeds, which are annually produced in vast quantities, and vegetate freely. The seeds are ripe in October, and should then be collected and carried to a convenient part of the nursery, and laid in a flat heap, mixed with light sandy earth; care, however, must be taken that they be not laid too thick, for if this be not attended to, there is danger to be apprehended from fermentation, to which they are liable when laid in too great a quantity together. To prevent too rapid a state of fermentation, they should be frequently turned while in this state; and when all danger of fermentation is over, they may be covered up till wanted for sowing. Some sow these seeds the spring subsequent to the gathering, others not until the autumn, and others not until the second spring following. Seeds of many trees may be kept in the rot-pit, as it is called, one or two, or even more years, without their vegetating, provided that they be excluded from the action of air and warmth.

Any part of the nursery, if not too wet, is suitable for sowing the seeds of this tree, as it is hardy and not liable to lose its vegetating principle. Before the operation of sowing is intended, the ground should be regularly dug and levelled, and if in a very poor state a little manure may be applied. When the ground is dug, the whole should be divided into beds of four feet in breadth, and on them the seeds should be sown, and regularly covered to the depth of half an inch, or rather more. Some nurserymen sow in broad drills, as is often practised for spinach in the kitchen-garden, and, by this means, the seedling plants have a greater share of air than when in broad beds, particularly when they come up thick, and are not thinned out sufficiently soon. During their stay in the seed-beds, they should be regularly weeded, which is all that is required till they be fit for transplanting out into nursery lines, which will

be the case the spring after sowing. As we observed in regard to alders of the same age, the strongest of these also should be selected first, and transplanted, which will not only improve themselves, but also be of much service to the smaller ones remaining in the seed-bed. In regard to the distance at which they should be planted, one foot or fourteen inches will be sufficient between the lines, and from four to six inches from plant to plant. Hoeing and cleaning the ground must be attended to between the lines, and the seed-beds must also be kept perfectly free of weeds. When ash-trees attain the height of from eighteen inches to three or four feet, they are fit for final planting out, where they are to remain, and, like the alder, may be planted of a large size with success. In ground prepared for planting by ploughing or trenching, small plants may be advantageously used, but when this precaution has not been attended to, and the ground is rough and foul, the larger plants should only be used. No doubt can exist that land trenched, and otherwise prepared, will be more congenial to the first progress of any tree; but it is seldom possible, we may say, to trench and manure land upon an extensive scale for the mere purpose of planting; and it is to be questioned if the superior growth of the plantation would pay more than the interest of the outlay. As for manuring land intended for extensive plantation, we confess we can see no real utility in it, were it possible even to procure manure in sufficient quantity. A superabundance, or even a sufficiency of manure, is only to be obtained round great and populous cities; and, unfortunately, for those who recommend this practice, there is little ground in such neighbourhoods likely to be planted with forest-trees while capable of producing corn and hay. Upon small plantations, in rich and highly cultivated countries, this practice may probably be attended with advantages which can never be brought to bear on poor and mountainous tracts of land, where all the manure capable of being made is found scarcely sufficient for turnips, potatoes, wheat, and barley, crops of more immediate value; and when the surface strata are such that it is often no easy matter to find soil enough between the fragments of rocks wherein to plant the trees, yet, in such situations, plantations have arisen within the last sixty years of thousands of

acres in extent, and stocked with every species of tree generally cultivated with a view to profit or utility in this country. The extensive and thriving plantations of the Duke of Athol, the Earl of Braedalbane, and other proprietors, who have planted on the most rugged and barren hills, bear sufficient evidence of the truth of this assertion. Those who have extolled the superiority of expensive planting, are, for the most part, planters in miniature, who, in planting half-a-dozen acres, have lavished away a few pounds; and who, like a certain great horticulturist of the present day, have treated with contempt the more rational and substantial methods which have been sanctioned by experience, and crowned with success, and which they have vainly tried to turn into ridicule. Planting must always be considered as an appropriation of a certain capital laid out by the owner of land, with a view to ultimate profit and repayment. With this view, such land only should be planted that is incapable of producing a more certain and greater produce. As it is no inconsiderable sum that is required to plant extensively, we ought to study the most economical mode of proceeding; and no one who attempts to plant to a great extent will ever, we think, attempt trenching and manuring his ground.

As to final situation, the ash deserves a good soil, and not to be planted in quagmires, or on bleak barren sides of hills, as we have frequently observed, for in such situations the timber never can, nor will be good. It is said to impoverish the soil very much, and therefore to be unfit for hedge-row timber; it were to be wished that the same fault could be discovered in every other timber-tree planted in similar situations, for then we might entertain some hope of being relieved from seeing, mile after mile for a long journey, those poor mutilated, distorted looking things called hedge-row timber-trees, by which many parts of the kingdom are so very conspicuously disfigured.

The valuable uses to which the ash is applied are so numerous as to be with difficulty enumerated. "It may be noted, however," says a writer on this subject, "that the ash possesses a very singular property, namely, that of being in perfection even in infancy, no other tree becoming so soon useful. A pole three inches in diameter, is as valuable and durable for any

purpose to which it can be applied to, as the timber of the largest tree. The plough and cart-wright, the coach-maker and cooper, are the chief consumers of ash-timber; though, in many parts of the country, it is likewise used for various utensils, and for some articles of furniture. The ash affords a greater quantity of pot-ash than any other sort of timber in this country."

Of this genus there are thirty-six species enumerated in the Hortus Brittanicus, of which twenty-five are natives of North America, two natives of Britain, four not known, and the remainder of the Levant, Corsica, Aleppo, and Tauria. Of the American species, only four were introduced prior to the beginning of this century, and, consequently, the merits of the others, as timber-trees, have not yet been ascertained with us. The accounts, however, we have of them, are sufficiently flattering to lead us to hope that 'ere another century begins, we may have several species of them added to our British timber-trees. The *F. excelsior* is the only one extensively cultivated for the value of its timber, but several of the others are sufficiently hardy, and of merits to demand the attention of planters. Most of the species perfect seeds, although not in this country, and are readily multiplied by that means. The varieties of *F. excelsior*, and those species which it is difficult to procure seeds of, increase readily by grafting on the common ash.

Beech.—(*Fagus.*)

The beech (*Fagus sylvatica*) is also a native of our country, and is found naturally in sandy loams, and in calcareous soils, and abounds in many parts of Buckinghamshire and Hampshire, of a large size, in a natural state. It is found to prosper in almost all soils, but attains its greatest bulk, like the oak, in alluvial soils, in valleys near the sides of rivers. It will also become a valuable timber-tree amongst rocks and stones, where there is little mould to be seen; and it thrives in strong retentive clayey soils, even although the sub-soil be spongy and wet; but the most valuable timber-trees are found where it has been planted pretty thick, and drawn up to a tall straight trunk. It is one of the greatest ornaments to the park, the lawn, or the

avenue, and, in the two former cases, assumes a very graceful habit and beautiful outline. The beech is propagated by seeds, which are called *mast*, and ripen in October. It should be gathered as soon as ripe, as it soon after falls, and is eaten by squirrels, mice, pheasants, and other animals. The seeds are contained in a *capsule*, which opens when ripe; these are to be gathered as they fall or are shaken from the trees, and carried to a dry loft, when they will soon open, and the seeds can then be readily separated by sifting, which leaves it in a fit state, if dry, to be stored in till the spring. Nurserymen generally spread out the seed upon the floors of dry lotts, in preference to keeping them in sacks, as they are apt to become musty when kept in the latter way. Traps should be continually set during winter to protect it from mice and rats, both of which not only eat it on the spot, but carry it to their retreats.

In March, or the beginning of April, beech-seeds should be sown in beds, as already directed for alder and ash. The ground should be previously prepared by digging, and laid out in beds to the extent required: the seeds should not be sown too thick, as the leaves are pretty large, and the seeds, if well saved, will vegetate readily. When the sowing is finished, traps should be set for mice, and every precaution taken to keep off pheasants where they abound, for if they once get at them, it will be no easy matter to keep them off again. Weeding should be attended to during the summer, and by the following spring, many of the most forward plants will be fit to plant out into nursery lines. A precaution is very necessary to be used in taking up seedling beech, for, like the walnut, chestnut, and some others, they have long tap-roots, which are liable to be broken off in attempting to pull them up by the hand. A spade therefore should be used to loosen them at their roots, but this must be done in a prudent manner, and only applied along the edges of the beds, which will be found sufficient. When the strongest of the plants are thus taken up, the remainder should be regulated, if at all disturbed in the process, so as to prevent the admission of drought to their roots. The distance at which the seedling beech, thus taken up, should be planted, may be the same as recommended for ash, and the same attention paid them

during summer, as to cleaning, hoeing, and weeding. The following spring the remainder should be taken from the seed-beds, and in like manner planted out. Indeed, it is a rule from which only extraordinary circumstances can warrant a departure, that all seedlings, when two years old, should be taken up; if this be not attended to, the roots become naked, and the fibres few in number. The beds at this time on which the seeds were sown may be all destroyed, for it is only in the case of thorns, hollies, and a few similar sorts, whose seeds sometimes continue to come up for two, three, or more years, after sowing, that any more plants can be expected after the second year. In taking up all plants from the seed-beds more attention is required than is usually paid to them. The spade should be judiciously used for the purpose of loosening the soil, and the plants pulled up gently with all their fibres and roots uninjured, for although the trees of which we are now treating are hardy and indigenous, they are nevertheless tender and easily injured in their young state. As they are taken up from the seed-bed, they should be immediately laid in by the heels, unless the operation of transplantation goes on sufficiently fast to use them as they are taken up. They should certainly not be allowed to be on the surface in heaps, with their roots exposed to the frosty winds, which often prevail at this season, nor to the scorching rays of the noontide sun, which is equally injurious to them. The operation of transplanting would be more successfully done in damp showery days, provided the ground was not too wet, but this, when there is much to be done in this way, cannot be expected to be always the case; as a simple and excellent succedaneum, we would recommend puddling the roots previously to planting, which will not take up much time, and will evidently tend to enable the plants to sustain their removal with much less chance of injury. We may here observe, that when trees are to be kept in the nursery longer than three or four years after their first transplanting, that they should be, if not every year, at least every second year, taken up and re-planted, allowing them greater room every time they are removed, in order that they may have room to extend themselves, and also a proper breadth of surface to stand on, to afford sufficient nutriment for their roots.

When beeches are from eighteen inches to three feet high, they are in good condition for final planting. But trees of larger growth are apt to become naked at their roots, and devoid of fibres, and, consequently, unfit for planting, at least with success. As to final situation, the beech will thrive in almost all soils, but in those that are light, loamy, light sandy, or calcareous, it is found to succeed best; where grounds of that description abound, the beech may be profitably planted.

Its various uses are many, although in less repute now than formerly, when it was much used in various branches of machinery; but it is now, in these cases, supplanted by metal of different kinds. It is, however, used for some parts of shipbuilding and machinery, and is in considerable demand with the cabinet-maker, tool-cutter, and turner. The small-wood and branches make excellent fagots, and are used for smoking herrings and making charcoal. The leaves make tolerable mattrasses, a circumstance noticed by Evelyn, as being prevalent in his day, and reminds us of the line of Juvenal—

"The wood's a house, the leaves a bed."

Beech-hedges were formerly very prevalent, but are now less general in and about gardens. They are of rapid growth, and can be planted of a large size, which is often desirable when a hedge is speedily required. Of this genus there are four species enumerated in the Hortus Brittanicus, two of which are natives of North-America, and one only of Britain; the native country of the fourth, *F. comptoniæfolia*, which has by many been considered as only a variety of the common beech, is not correctly known. The American species are said to be valuable as timber-trees, but have not yet attained a proper size, nor are they in sufficient number in this country to form a correct idea how far they might be advantageously planted with a view to profit. The fourth species is seldom seen out of the arboratum or shrubbery; its merits, as a timber-tree, cannot be therefore calculated upon. Seeds are obtained of the American species from that country, by which they are increased, and the varieties, and the *F. comptoniæfolia*, are increased by grafting or inarching on the common sort.

Birch.—(*Betula.*)

The *Betula alba*, the only species of this genus cultivated with us as a timber-tree, is a native of Britain, as well as some varieties which have originated from it. It is found growing naturally in almost every kind of soil, and at a considerable altitude above the sea, as well as in the alluvial soils by the sides of the lowland rivers. The most durable timber of this tree is obtained from trees growing on the sides of hills amongst rocks, where, although its growth is much less rapid than in more congenial situations, its timber becomes much more valuable, not only on account of its durability, but also for its singular beauty, and, in such cases, it is made into beautiful pieces of furniture.

The fragrance of its foliage, and the elegance of its habit, claim a place for it in all ornamental plantations, and when planted out on the lawn, or in the park, its natural beauties are pleasingly developed. Upon the steep sides of hills, and in deep ravines, few trees are more beautiful than the white birch. The variety with drooping leaves (*B. pendula*) has long been held in high estimation, and, although anxiously propagated in England, is never likely to be so abundant as in the northern parts of Scotland, where, in many districts, it abounds more plentiful than the original with upright branches.

It is propagated from seeds, which ripen in October, and should be then gathered and dried as directed for alder, which it very much resembles. In spring it should be sown in well-prepared beds, finely dug and raked, in a soil rather humid. Care must be taken not to cover the seeds too deep, as they are liable to be injured, and often rot in the ground; and therefore we find some nurserymen sow them on the surface of finely-pulverized earth without any covering whatever. Birch-seed is not unfrequently successfully sown in autumn, that is, as soon as it is gathered from the tree, but unless in very favorable situations the young plants are liable to accidents during the winter. It is not easy to say how thick the seeds should be sown, as it is difficult to ascertain their quality;

however, they should be sown thick to ensure a crop, and if the plants come up too closely, they must be thinned before they begin to injure one another. During the first winter after sowing, young birch-plants are liable to be thrown out of the ground, and in time of frosts care must be taken to prevent this as much as possible, for which purpose nurserymen cover the beds with a thin sprinkling of rotten tan, which has undergone a long period of decomposition, and some, with less judgment, cover them with fresh saw-dust. As the ground is generally moist in which birch-seeds are sown, we would suggest that the alleys, or foot-paths, between the beds be cleared sufficiently to allow of all superabundant moisture passing freely off, as the drier the beds are kept during winter, the less liable will the plants be to be thrown out by frost.

The strongest plants will, in the spring following the sowing, be in a fit condition to prick out into nursery-beds, or into lines; in the former case they should stand at from three to four inches apart, if very small; but if larger, should be allowed nearly double that room; and if put out into lines, they should be from twelve to fifteen inches distant, and from four to eight inches in the line, according to their size and strength.

Their future routine of culture consists in keeping the ground perfectly clear of weeds, and if not planted out permanently from these beds or lines, they should, the season after their first planting, be taken up and planted in lines at a greater distance from each other. Birch is seldom planted with a view to attain large timber-trees, its natural size being that of a tree of the third or fourth class of magnitude, although solitary instances occur of its attaining a very considerable size.

As a copse-tree, the birch becomes valuable, and bears cutting at stated periods profitably. It also obtains a place in all ornamental plantations, in consequence of the fragrance of its foliage and singular beauty of its outline; and few trees are more pleasing when grouped or planted singly in the park or lawn. By the sides of ponds, lakes, or rivers, the birch flourishes and gives a richness to the scene by the diversification of its growth, as well as its distinct character of head,

from that of almost all other trees. The sides of hills, and chasms between rocks, are also peculiarly improved by the varied and undulating character of this tree, and when planted *en masse*, or scattered promiscuously through the grove, it becomes equally interesting.

In England, the timber of the birch is less regarded than in Scotland, where the highlanders make use of it for almost every purpose where useful, durable, or beautiful timber is required. But only there is it to be found in perfection. As a fuel-timber, the birch has this peculiarity of burning clear, and emitting a pleasing perfume, without producing near so much smoke as most other timber, and is therefore much used in the smoking of herrings, and in the preparation of malt for the most esteemed whisky. Houses are built of it with the bark left on, which last for many years; and furniture is made of it, little inferior to that inlaid with satin-wood. The wheel-wright, mill-wright, and turner, use it extensively, and of late years its value was much enhanced, for the purpose of making barrels for the herring-fisheries.

The bark contains a considerable degree of astringency, and is probably next in value to that of the oak. The juice extracted in spring, affords when it has undergone the vineous fermentation, a pleasant liquor, known as birch-wine. Professor Pallas states, that the highly-prized Russian leather owes its agreeable smell to an oil extracted from this tree. "The oil," he says, "is prepared from the white bark, either taken from the live tree, or collected from those that are putrid in the woods. It is best made from the latter: because, by the putrefaction, it is freed from the inner bark; and the external white bark remains uncorrupted for ages, as appears by the old burial-places of Janisea, and the vaults of the very ancient city of Moscow, which he observed covered with birch-bark. The bark is gathered into a heap, and pressed into pits made in the shape of a funnel, prepared in clay-soil, and when set on fire it is covered with turf. The oil, distilling through the clay-hole at the bottom of the funnel, drops into a vessel placed to receive it, and it is then tunned into casks made of the hollowed trunks of trees. The pure limpid oil swims at top, and is in the greatest request for anointing

leather, on account of its antiseptic quality. The residuum is thick and sooty, and is employed for various common uses.

Of this genus there are seventeen species enumerated in the Hortus Brittanicus, ten of which are natives of North-America, two of Britain, and the remainder of various parts of Europe. Some of the American species have merits as timber-trees, but those of Europe, excepting the ***B. alba***, and its varieties, are merely cultivated for ornament. All or most of them are originated from seeds, which they ripen in their native habitats. The varieties of either may be successfully increased by grafting and inarching on the common sort.

Cherry or Gean.—*(Prunus.)*

The common cherry, ***Prunus cerassus***, is considered as indigenous to this country, and is found in so many situations, and under such a variety of circumstances, as seems to justify the conclusion. The wild cherry, or gean of the Scotch, is a different species, and described under the name of ***Prunus avium***, or pubescent-leaved cherry. Both attain a considerable size; but the latter is by far the most valuable timber-tree. The wild-cherry, or gean, considered as a fruit-bearing tree, has considerable merits, and many varieties of it are to be met with in the gardens of the Scotch, who are fond of the fruit. Considered as a timber or ornamental tree, it has also considerable merits, and adds much to the beauty of our woods, groves, and parks, in spring, with its profusion of snow-white flowers, and in autumn by the varied and rich hues its decaying foliage gives the landscape; a circumstance often noticed and availed of by the artist. The soil and situation most congenial to the wild-cherry, are that of a sandy loam, on low ground or sloping banks. In wet cold soils it seldom succeeds; and if planted in rich soils, although it attains there a considerable bulk, becomes much less valuable, the timber being soft, light coloured, and of no durability; whereas, in sandy loamy soils, it becomes hard and beautifully variegated in the wood, and of great durability.

The wild cherry is propagated from seeds, which are ripe in July, and may be either sown immediately, or preserved in sand till spring; it requires to be planted out in nursery lines

from the seed-bed, where it may remain till planted out; or if wanted of a larger size, should be transplanted when two years old, at sufficient distance to allow the trees to attain a proper size for final transplanting. Stocks whereon to bud or ingraft the different varieties of the cultivated cherry, are obtained by sowing the seeds or stones of the different varieties of the wild and cultivated cherries; and when such is the case, the two years old seedlings should be attended to in the nursery lines, and properly pruned and trained to model them into stocks, either for producing dwarfs or standards, as may be required.

The wild cherry attains a size sufficient to produce timber in planks of from one foot to two feet in breadth; and if grown in a light sandy loam, will be durable, and of a beautiful colour. It has attained the name of Scotch mahogany, which it very much resembles when polished and stained. It is in considerable request amongst cabinet-makers, and by them manufactured into chairs, tables, and such like articles of furniture.

Chestnut.—(*Castanea.*)

The sweet or Spanish chestnut, as it is generally called, probably to distinguish it from the horse-chestnut is by some, considered to be a native of this country; and if so, it must have been much less cultivated than it now is, or else much less abundantly diffused, for there are very few instances of its being found of a great age, unless in situations where it must evidently have been planted. It is more probable that it has been introduced into this country; and some date its introduction to the time of Tiberius Cæsar, who is said to have brought it from Sardis into Italy, and from thence it might find its way into Britain, either by the Romans or the clergy.

The Romans gave this tree the name of *Castanea*, after a city of that name in Thessalia, from whence they first procured it, and where it is grown in great abundance by the Grecians; and what may be considered a singular circumstance, it still retains the same appellation in all the European languages.

Amongst those who affirm the chestnut to be indigenous to this country, may be noticed Dr. Ducarel, who states, in his

Anglo-Norman antiquities, that it is a native tree, and brings in as a proof, the existence of the wood in some of the oldest houses in London; but it is probable that what he has taken for chestnut, was only oak of a similar grain. He, however, appeals to a deed of gift, which is still in existence, from Henry the Second to Flexly Abbey, of the tithes of all his chestnuts in the forest of Dean.

The historian Camden informs us that Cowdery Park, in Sussex, abounded with fine trees of this kind; and Cheshunt, a village in Hertfordshire, is supposed to derive its name from the chestnut trees, which once abounded in its vicinity.

We certainly agree with Philips in believing that it was introduced by the Romans, who, having been masters of this country for nearly four hundred years, and being so much attached to horticultural pursuits, we may naturally conclude, would not fail to transport hither their hardiest kinds of fruits, and particularly those which were used as a substitute for bread.

The oldest specimens, probably, of this tree, which we have any account of in this country, is that of the great chestnut of Tortworth, in Gloucestershire, which has been noticed by the earliest historians of our country, and is supposed to have been 1100 years old. This tree is one of the most magnificent of our timber-trees, and equalling the oak both in height and bulk. Its longevity is great, as is sufficiently proved by the celebrated specimen on Mount Etna, which has attained the astonishing circumference of 204 feet. Some instances occur both in England and Scotland of its attaining the size of from thirty to forty-five feet in circumference; and, upon a moderate calculation, it would require a period of more than 500 years to attain that size. The chestnut not only thrives in any soil in which the oak is grown in perfection, but also attains a considerable size in soils of a poorer nature, and will make excellent copse-wood in almost any soil. Wet strong soils are, of all others, the best suited for this tree, when the object in view is to attain fine timber-trees. As an ornamental tree, few excel it, either in the beauty of its foliage, flowers, or the magnificence of its habit. "It is therefore very proper," Sang observes, "for the decoration of the park and of the lawn. Many chestnut-trees, however, should not be planted close to

a residence, because," as he observes, " the flowers emit a very disagreeable odour, which is offensive to most people."

It is observed by Philips, that it is the tree which graces the landscapes of Salvator Rosa, who painted on the mountains of Calabria, where it flourishes. Its ramifications are more straggling than even those of the oak, while its foliage, which is more loose and brilliant in colour, is less subject to the attacks of insects; and its yellow and umber tints greatly relieve the sable hue of the fir and the pine, and act like a blossom to enliven the month of November.

This tree is propagated from seeds, which ripen in England in October in fine seasons, but seldom, if ever, in Scotland. Nurserymen are supplied with home-saved seeds in good seasons, but, in unfavourable ones, from Spain, where this fruit is yearly ripened and imported into this country from thence as an article of luxury, and appears at our desserts from October till April. Chestnuts imported are by far the best either for the purpose of sowing or eating. They should be sown as soon as gathered or imported, in seed-beds or in drills, and covered to the depth of two or three inches. Mice and rats are very fond of this seed, and if once they find them in the ground, it is no easy matter to keep them off; attention should therefore be paid to guard them against such enemies. When the young plants appear in spring, and during the time they remain in the seed-beds, they should be kept clear of weeds; and the spring subsequent to the sowing they should be taken up, sized and transplanted into nursery lines twelve or fifteen inches distant, and five or six inches apart in the line. The season following they will require to be taken up and transplanted at greater distances, to afford them space to attain a proper size for final planting out. Chestnuts may be planted out when three years old, if the ground has been at all prepared for them; or they may remain in the nursery till they be five or six years old, and then may be planted out with success.

The timber of the chestnut-tree very much resembles that of the oak, and, according to Sang, approaches it in value next to the ash and Scotch elm. But what has been long mistaken for this wood in the roof of Westminster-Abbey, and that of the Parliament-House at Edinburgh, and other old buildings

in both of those cities, as instanced by Sang, seems very doubtful, and particularly so if this be not a native tree, which we see little probability of being able to confirm. It is much more rational to suppose, with Daines Barrington, and Professor Martyn, that what has been mistaken for chestnut, is in reality nothing but oak of a different grain; and the old pipes which are supposed to have been laid to convey the first water to the metropolis, and stated to have been of this wood, were, in all probability, nothing else but oak. The timber of this tree is, however, truly valuable, and will stand in situations exposed to wet and dry, when divested of its sap-wood, longer than oak; and for gate-posts ranks in durability next after the *Acacia*, yew, and probably also longer than the larch.

The following is adduced in support of its durability when exposed to wet and dry, and is extracted from the Transactions of the Society of Arts for 1789.—"In or about the year 1763, some gate-posts of oak, and others of chestnut, were to be repaired; they had the appearance of being put in at the same time, but the latter were much more sound, insomuch that some of them were adjudged good enough to remain as gate-posts, and are now to be seen there (1788). Such as were too small were taken up, and set as posts to fix rails to. At the same time some new posts of oak were put in, there not being enough of the old chestnut posts. Though these were old when put in, twenty-five years ago, they are now (1788) more sound than the oak posts, which were then new. One side of the chestnut posts was the outside of the tree, but the timber is as sound there as in any other part, which would not have been the case with oak, the sap of which, next the bark, soon decays. The chestnut gate-posts had been put down many years before 1745; they have, therefore, probably stood the weather above half a century."

Philips, in his History of Fruits, informs us, that the chestnut wood has recently been successfully applied to the purposes of dying and tanning, thus forming a substitute for logwood and oak bark. Leather tanned by it is declared, by the gentleman who made the experiment, to be superior to that tanned with oak bark; and in dying, its affinity for wool is said, on the same authority, to be greater than that of either

galls or sumach, and, consequently, the colour given is more permanent.

The wine casks in Italy and Spain are almost all made of this wood, and are preferred to any other, as being less liable to shrink or to communicate a disagreeable flavour to the contents. The bark has a considerable degree of astringency, and contains the tanning principle in about the same proportion with the larch and mountain-ash.

Of this genus there are three species, the common or sweet chestnut, the *C. Americana*, and *Pumila*, natives of North America. They are all propagated by seeds, which are occasionally imported, and the varieties are increased by grafting or inarching upon the common sort.

Horse-chestnut.—(*Æsculus.*)

The common horse-chestnut, *Æsculus hippocastanum*, is a native of Asia, and was introduced into this country in 1629. As an ornamental park-tree, few trees excel it, either in the splendour of its bloom or beauty of its foliage. It requires a loamy soil and sheltered situation, but is seldom injured by our severest frosts. As a timber-tree it has no pretensions, for although it attains a large size of trunk, the quality of the wood is such as to render it of little estimation in the eye of the profitable planter.

Gilpin observes, it is far from being a picturesque tree, its outline being that of a parabola; but all beauty is not picturesque beauty, and the foliage and leaves will ever advocate the cause of this tree, which, as Daines Barrington observes, may be compared to a giant's nosegay. It was formerly much used as an avenue-tree, both on the continent and also with us, as abundant examples are still in existence to prove.

It is propagated from seeds, which ripen most seasons with us in October; they generally drop out of their seed-vessels when ripe, and are gathered from the ground. They should be sown as soon as gathered, either in seed-beds, covered to the depth of two and a half or three inches, or in drills, to the same depth. If it be not convenient to sow them as soon as gathered, they should be slowly dried on a dry floor, and

frequently turned over, to prevent them from turning mouldy, a circumstance which often happens when they are kept in sacks, or too closely confined. The same enemies attack them that attack the sweet or Spanish chestnut, both in the seed-house, and also after they are committed to the ground. What has been said on the after-culture of the sweet chestnut is applicable to this tree also, only as the timber is far less valuable, of course a much less number of plants should be originated. The horse-chestnut, like most other soft-wooded trees, may be safely removed when of a large size, and when planted with a view to give effect in park scenery, should not be less than from six to ten feet high when planted; by which means, and by carefully guarding them for a few years against the attacks of cattle, they will the sooner be able to stand unprotected than if planted when of a smaller size.

Elm.—(*Ulmus.*)

Of this genus there are six species, which are natives of this country, and all of them possessing considerable merits as timber-trees. Of these, the ***Ulmus campestris***, English elm, and ***Ulmus montana***, Scotch or Wych elm, are considered the most valuable. The former of these is a very ornamental tree, considered either as a hedge-row tree, or to stand singly in the park, and several beautiful specimens may be seen of it in many of our best planted English parks. It is an exceedingly useful tree all over England, and it is with regret that we see it so frequently, nay, almost universally mutilated into so disgusting and ugly a state in our hedge-rows. "Nothing certainly can be more tiresome," says a very intelligent author, and keen observer of the mismanagement of this tree, "in travelling through the flat countries than the continual succession of meagre elms, like poles; from which we are now and then relieved by Lombardy poplars! which are worse, if possible, though occasionally, no doubt, by a much finer plant than either, the elder."

The wood of the English elm is very far inferior to that of the Scotch elm, both in durability and value. It is stated by Sang, in confirmation of this assertion, that, "in the sales

of these timbers, the English elm, amongst good judges, seldom brings more than a half, or even a third of the price of the Scotch elm, although both be of equal size and age. Prejudice, no doubt, may have some share in this matter, but certainly the timber of the one is very inferior to that of the other. Indeed, if it be considered that the one species is exceedingly hardy, and universally raised from seeds, and that the other may be even termed delicate, at least in Scotland, there can be little hesitation in determining which deserves the preference as a forest tree. The English elm is too frequently raised from layers or suckers. These never make the best trees; and they always produce suckers from their roots, and disfigure the grounds in which they stand. When intended for ornamental trees for the park or the lawn, they ought to be budded or grafted on the Scotch elm; in this way trees of superior vigour and figure will be obtained, and will never produce a sucker." Of this elm there appears to be very many in Scotland, although there are few of the Scotch elms, comparatively speaking, to be met with in England.

The Scotch elm attains a considerable magnitude, one of which is described in the Selkirkshire Report, p. 287, as being thirty feet in circumference, at four feet from the ground. And another, which we have frequently measured, which stands on the lawn at the east end of Taymouth Castle, is still a growing tree, and is fifteen feet nine inches in girth, nearly six feet from the ground. The merits of this species, in respect to its effect as an ornamental tree, places it next to the oak, to which it nearly approaches in its appearance, when cultivated in the grove or profitable plantations; "if properly nursed and trained, it becomes a straight, tall, and large-stemmed tree. In hedgerows it also becomes most useful and durable timber; and in open woods it naturally assumes many fine casts and forms for the purpose of ship-building and the like. In short, the timber of this tree is so useful and valuable, that it is always prized next to the oak."

The soil in which this elm seems to prosper best is in a deep rich loam, although it will accommodate itself to almost all soils. In light sandy soils, upon a rocky bottom, this tree becomes most valuable in regard to its timber. Wet tilly clays

are of all soils the least congenial to it, but even in the crevices between rocks, where there is little soil of any kind, and on bleak exposed hills, this elm will attain a considerable size.

The different species of elm which perfect seeds, should be always originated from them: this is, however, not generally, by any means, the case; and hence follow, as a natural cause, the many distorted and worthless trees, which we daily see in plantations and forests, where more expeditious means have been used to produce plants of fit size for sale or planting. Our opinion is (although differing from men whom we esteem, and from whose writings we have derived much pleasure and advantage) that no tree should be propagated by other means than by seeds, unless extraordinary circumstances warrant a departure from that natural rule; and in collecting the seeds of all trees, greater care should be taken to select the seeds from the healthiest and most vigorous specimens, and not indiscriminately, nor by people unacquainted with the distinctions between a good and a worthless tree.

The seeds of the Scotch elms ripen abundantly about the middle of June, and should then be collected, and sown immediately after. Upon this subject Sang offers the following rational remarks:—"Elm-seed, when newly gathered, especially at this season, and kept together in a large quantity, has, on account of the juicy nature of its capsule, a great tendency to heat. It will, therefore, be proper to gather no more on one day than can be sown on the following morning; and it will even be right to spread the seeds thin during the night. The necessity of this precaution generally shows itself, for before they can be brought home in the evening of the day on which they are gathered, if there be a bushel or two in the sack, they will be found very hot. We have often observed them so much so, that if they had lain in that state till the morning, many of them would never have vegetated." Sometimes, however, elm-seeds are gathered with a view to keeping them for some time, as is the case when it is not convenient or possible to sow them till autumn or even spring; and it also happens when the intention is to send them to a distance. In these cases, some attention is requisite, both as to the gathering of the seed, and also to curing it, so that it may be kept

for some time with safety. When the seeds are observed to be perfectly ripened, they should be gathered immediately, as the procrastination of a single day often defeats the object in view, particularly in wet and windy seasons, as has been the case at the very time we were writing this article. High winds and rain have followed so closely, that we have been unable, with all diligence, to collect a single bushel of this seed. The following extract we are induced to give upon this subject from Nicol's Planters' Calendar, edited by Sang, a very respectable and excellent nurseryman; and we are the more induced to adopt this step as it is in unison with our own ideas upon the subject, although differing in principle from that of some of the writers of the present day:—"In gathering elm-seed, it should be chosen from the tallest, and most handsome, and healthy trees. Indeed, in every case, seeds should be collected from the most promising and healthy trees of their kind. Plants, like animals, in some measure, convey to their progeny their appearance and habits, whether good or bad. Therefore, although a tree have an abundance of apparently perfect seeds, if it be either visibly diseased, or be an ill-formed plant, not a seed should be collected from it. It is well known that disease and deformity in plants frequently do not prevent them from abundantly procreating their species. Indeed, in gardening, we always find that retrenching the roots of very healthful young plants is the surest method to throw them into fruit; though such retrenchment evidently makes the plant less healthy than it previously was."

As the English elm seldom, if ever, ripens seed in Britain, its best mode of propagation is by grafting on the Scotch elm, and not by layers, which is so generally the case. Grafting elms has been long a practice amongst nurserymen; and Langley relates a case of a nurseryman at Brentford-End, who purposed obtaining a patent from George the First for grafting and budding the English elm upon the Dutch elm, with a view to improve the growth of the forme; and Virgil asserts, but which we much doubt the truth of, that a union will take place between the elm and the oak. Our ingenious countryman, Evelyn, speaks of the grafting of elms as being known and practised in his day.

Elm-seed may be sown as soon as collected from the trees, but we would rather advise saving it till March or April, or making three sowings: one in June, when the seed is gathered, one in March, and a third in April. The ground for the seed-beds should be rather rich, having been under a slight crop the preceding season; and if not manured for it, it should be done previously to sowing the elm-seed. As this seed does not require to be deeply covered, it is necessary to have the ground finely dug and raked before the beds are formed, which should be four feet in breadth, and the seed covered to the depth of half an inch. Sometimes the crop of summer-sown elms is destroyed in winter, when the season has been dry and the plants weak, and in such cases they are liable to be thrown out of the ground by the frost. Sometimes the spring crop is destroyed, if sown too early and severe frosts occur just as the tender plants are coming up, but by sowing at the three stated periods above recommended, we have three chances of obtaining a crop. It is advisable to sow elm-seed rather thin, as the seeds are in general good; and as it is better that the plants should remain two seasons in the seed-bed previously to their being planted out into nursery-lines, they will have a chance of attaining greater strength than if they were too much crowded in the seed-bed.

The after-management of elms, while in the nursery, differs not from that of other trees already noticed. They may be planted permanently out on trenched or prepared land, when four years old from seed; or, if in unprepared ground, they should be allowed one or two years longer. All the species of elm succeed, though planted of a large size; although, like most other trees, they prosper much better when planted before they attain too great an age.

Of this genus there are seventeen species enumerated in the Hortus Britannicus, six of which are indigenous to this country, five of North America, one of China, two of Siberia, one of Hungary, and two undetermined. The British species are the most valuable with us, although there are several of the North American ones which would, in all probability, be worth the notice of the planter; of the remainder, their merits, as timber-trees, are of no account. Such of this family, of

which it is difficult to procure seeds, may be readily increased by grafting or inarching: by either process a union speedily takes place. The Dutch elm, *U. Major*, of English botany, *U. Suberosa*, of Willdenow, although enumerated as a British species, is supposed to have been introduced here in the time of King William. The tree is of rapid growth, but the timber is not of much value. Dr. Walker even doubts if the common English elm, *U. Campestris*, be not also an introduced plant, and asserts that it was originally brought from the Holy Land.

Hawthorn.—(*Mespilus Oxyacantha.*)

The hawthorn, although it is sometimes to be met with of a large size, cannot be altogether considered as a timber-tree, neither is it planted with a view to its attaining that size. It is, however, no less valuable, when considered as the best plant we have for the purpose of making living fences. It is widely diffused through the greater part of Europe, and with us in particular; it is found naturally in a variety of situations, and obtrudes itself upon our notice in the various characters of underwood in the forest or copse, as a detached tree in the park, and forming, as it were, natural fences by the sides of fields, &c.

"As underwood in the forest," Sang observes, "where it grows spontaneously, it may rather be considered as out of place, and a nuisance. In the park, if growing at the foot of, or near a fine oak, it has an excellent effect. As a detached tree, if large and well formed, the hawthorn never fails to please. When clustered in handsome groupes on the lawn, hawthorn trees are very ornamental, particularly when in blossom. As a shrub, or a bush overhanging a rill, in a valley or dell, by the end of a mill, or the side of a cottage, the hawthorn appears to great advantage."

The timber of the hawthorn, when it attains a proper size, is very valuable, and was much used by the millwright previously to the use of cast-iron, which has latterly been substituted for it. Sang observes, that the timber of this tree is often spoiled through inattention after cutting. If it be allowed to lie in the tree, it soon heats, and becomes brittle and worth-

less. It ought, therefore, he says, to be instantly cut up into plank, and laid to dry.

The principal use to which this plant is applied, is in the forming of fences, for which it is well adapted, and for this purpose is yearly propagated in vast quantities by the nurserymen. It is propagated from seeds which ripen in October, and may, in most seasons, be collected from old hedges in any quantity. As the seeds are collected, they should not be allowed to remain in sacks, nor too many of them put together, as they are extremely apt to ferment; and if such a circumstance occurs, many of them will be spoiled. As they are collected, they should be carried to the nursery, and spread out in a convenient spot (which, from the process the seeds undergo, is termed the rot-ground) not more than ten or twelve inches thick, and mixed with any light dry sandy soil. While in this situation, great care must be taken that they do not ferment too much, for fear of injuring their vegetative properties; if at any time fermentation becomes too great, they then should be turned over once or twice, which will sufficiently counteract that tendency, as well as hasten the decay of the pulpy matter with which the seeds are covered. In this situation they should remain for one year at least, although some nurserymen leave them for two. The intention of thus placing them in such a situation is, that hawthorn, ash, mountain-ash, and some other seeds, do not vegetate the first season after being gathered; and were they sown at that period, would be one year at least in the ground without vegetating. During that time they would be liable to be destroyed by vermin, the ground would be occupied to no real advantage, and an unnecessary expense would be incurred in weeding and cleaning the ground. As some of these seeds commence vegetating about eighteen months after they are gathered, it is judged the best practice to sow them into beds at that time, that is, the February or March following. In choosing ground wherein to sow hawthorn-seeds, it should be light; and if not moderately rich, should be made so by the application of good rotten manure.

It is likely that the beds now formed will require to remain so for three years, as it will not be before that period

that all the seeds will have vegetated, and the young plants attained a size fit for transplanting into nursery-beds or lines. In sowing this, and most other seeds, the ground should be deeply and finely dug; and as the beds for this seed are to be formed by having a portion of the surface pushed off with the back of a rake, or what is called cuffing, amongst nurserymen, it is necessary, for the better executing that process, that the ground be deeply and finely raked as the process of digging goes on. When the ground is thus prepared, the beds are marked off at the required breadth, which is generally from three to four feet, and the process of cuffing is then proceeded in, in the following manner:—

"After the ground is dug, and raked fine, as above, measure the purposed width, stretch the garden-line, and run it off along the side by the tread of your feet; return with one foot in the tread of the other, and so as to form an alley of three times the breadth of your foot. Having shaped the bed by these means, and being provided with a wooden-headed or cuffing-rake, stand on the alley on the opposite side of the bed; turn the rake on its back, and push off the earth from the one half of the bed to the purposed depth, as far as the side of the alley marked by your feet, being careful to keep the earth so pushed off quite straight. When one side is finished, turn round, and do the other in the same manner. Having completed the cuffing of the bed, carry the rotted haws in a close-wrought basket in one hand, and with the other lift them out; and with a sudden dash, cast them along the half of the bed next to you; turn round, and do the other side in the same manner. If your seeds be good, they should lie within one-fourth of an inch of each other. Having completed the operation of sowing, if the state of the seeds will allow, draw a roller of about sixty pounds weight, and exactly the breadth of the bed, along it, which will press in the seeds, so as they will maintain their place during the operation of drawing on the earth again, which is presently to be done. If, however, the seeds be too moist to allow the roller to pass over them without sticking to it, beat them in with the back of the spade. The operation of fixing them in the soil being performed by one or other of these means, take the rake,

stand on the alley on the opposite side of the bed, put in the teeth of the rake immediately beyond the cuffing or ridge of earth pushed off, and by a sudden pull draw it on the bed, so as to cover its lower half equally; and having finished this half, turn round, and finish the other in like manner, and the operation is completed."

Sometimes haws are sown in drills, which, upon the whole, is a much better way, as affording a freer circulation of air to pass through the plants; and as the largest and best plants are always to be found on the outsides of the beds, sowing in drills, instead of beds, presents a greater number of outsides, and consequently a greater number of strong plants. When this mode of sowing is to be adopted, it should be carried on as the ground is dug; thus having dug the breadth of eighteen inches or two feet, stretch the line parallel to the trench, and with a broad hoe or spade form a drill about nine or ten inches broad, into which sow the seeds, and cover with the mould taken either out of the drill already sown, or from the next following. While performing this operation, the operator should stand in the trench, which will not tread the dug ground; having sown one drill, proceed to dig another breadth, and so on until the whole be finished.

When the seeds of hawthorns have been one year sown, it will be necessary to draw the strongest plants from the seed-bed, to be transplanted out into nursery-beds or lines; in taking up these plants, the greatest care ought to be taken both to preserve the roots of the plants removed from injury, as well as the seeds which may not yet have vegetated, and the small plants left to gain strength for another season. To facilitate the pulling up of the young plants, the beds should be loosened with a fork in a careful manner; and when the plants are removed, the beds should be regulated so as to leave them that the drought may not penetrate to the tender roots of the plants which are left. Those taken up should, as soon as possible, be planted either into beds, at about four inches apart, plant from plant, or into lines twelve inches distant, and four inches apart, plant from plant, where they are to remain, if in beds as above, for one season only; but if in lines at the above distance, they may remain for two years,

by which time the most forward of the plants will be fit for planting out for hedges, and the less forward should be planted again in the nursery, to gain strength for another season or two.

When hedges are to be planted, and afterwards attended to in a proper manner, the younger the plants used the better. But it must be confessed that, in general, the management of hedges is very little attended to, even by those who ought to be most sensible of their utility; and we find it very frequently the case, that after a hedge has been planted, very little is thought of it afterwards. Cattle are allowed to browze on it, if the plants ever attain a size sufficiently large to rear their heads above the weeds, with which they are allowed to be smothered; and if they be fortunate enough to attain any height, they are often allowed to grow on until they become quite thin at the bottom, and after being five, six, or ten years planted, are probably cut down to the bottom, to be again, for a year or two, liable to all the disasters and accidents which they had weathered in their growth. Those who wish to have good and substantial hedges, must pay some attention to the plants during their first few years' growth. Keeping them clean, guarding them against the browzing of cattle, and a judicious application of the hedge-knife, is all that has to be attended to; and if judiciously done, and followed up, good and substantial fences may be expected. Upon this subject Sang offers the following excellent remarks:—"The rapid progress of the hedge depends, in a great measure, on the goodness of the plants employed. The goodness of these, however, does not so much consist in the thickness of their stems, as in the numerous fibres of their roots. A very thick-stemmed plant may have hardly a fibre at its root to support it when planted. The most desirable plants are, therefore, such as have the greatest number of fibres at their roots with a clear and vigorous stem. It must be observed that, if thorns stand in the nursery-line more than one, or, at the most, two years unremoved, their roots become thinner of fibres, which consequently render them less fit for the purpose of planting for hedges, than if they had been removed at an earlier period of their growth. One-year seedlings of good growth, nursed

for one year in rich earth, will generally make fitter plants for planting out than when they are allowed to stand for two or three years in the nursery-lines. Two-year seedlings, carefully lifted from the seed-bed, so as to preserve their roots entire, and when one year nursed in rich mellow earth, will also make excellent plants for hedges. Indeed, plants of these ages, so treated, will outgrow those of greater size in any soil or situation whatever. The obvious cause is, that small plants, even by the same treatment, are raised with better roots in proportion to their stems than larger plants. In the choosing of quicksets, respect should therefore be had to the roots more than to the tops of the plants.

"But there is a double advantage in using young plants as above recommended. If they are to be bought, they will cost less money than older ones. If they be reared in a private nursery, less time is required, as well as less labour to produce them. Further, they are better fitted for very exposed situations than such as are older: not because their tops are less bushy, which, since these are to be cut off, is immaterial, but because they have better roots and more fibres in proportion to the stems, and of course are better fitted to seek pasturage for their sustenance, and to take a firm hold of the soil."

Previously to planting quicksets or thorns, it is necessary to shorten them considerably, and this is done by taking them up in small handfuls; and having laid them straight, the tops, to within about six inches of the part of the plants that were under ground, are cut off with a sharp hatchet on a block of wood. Some people shorten every plant individually with a knife; but if the other method be properly done, it will be found far more expeditious aud equally complete. When the plants are so shortened, only the tips of the long tap roots, or such as are without young fibres, should be shortened, and that only to a very limited extent.

Holly.—(*Ilex Aquifolium.*)

The holly is a native of Britain, and found growing in woods and forests as underwood, and also on elevated and

bleak hills and deep valleys in many parts of the kingdom. It is an evergreen-tree, of great longevity, and valuable, either when considered as ornamental or useful. There are many varieties of this genus to be met with in those situations where they abound, and in a cultivated state above forty pretty distinct varieties are to be had, many of which are exceedingly interesting and curious. As a timber-tree, it becomes valuable when of a great age, and is in all stages of its growth, admitted into the park, the lawn, and the flower garden, with good effect. Hedges are made of it, which are impenetrable, and some beautiful specimens still exist, which must have been planted above two centuries. Hollies are propagated from seeds, which ripen abundantly every season, and the varieties are increased by budding and grafting them upon the common sorts. In October the berries are ripe, and should then be gathered, and, as observed in the case of hawthorn-seeds, they should not be allowed to remain in sacks nor heaps together, as they are apt to ferment violently, and in such cases many of them would be spoiled. As they are gathered, they should be carried to the rot-yard in the nursery, and treated as already observed in the case of haws. Holly-seeds generally require to remain for two years in the rot-yard, to secure their speedy vegetation when sown, but as some of them will vegetate the second year, it is considered good practice to sow them after one year's rotting; when sown, they will continue to come up for two seasons, and probably a few will not spring before the third. When the seeds of this tree are to be sent to a distance, provision ought to be made to prevent them from heating too much while closely packed up, a circumstance which very frequently happens, to the loss of the purchaser. Sang recommends packing them in deep narrow hampers, and to put not more than one bushel into each. Were it equally convenient to the parties, it would be a much safer way to dispose of those seeds only that have undergone the change in the rot-heap, instead of the fresh-gathered berries. In the latter case, there would be much less danger to be apprehended from fermentation, and no possible injury could happen to the seeds in the one way more than the other. In regard to sowing the seeds of holly, the same precautions should be used

in preparing the ground, in forming the beds, and covering the seeds, as recommended in the last article. When the plants have been two years in the seed-bed, they should be taken up, and transplanted into nursery-lines, or into beds, allowing the plants in the latter case to stand at from four to six inches apart, and in the former, one foot between the lines, and four inches plant from plant in the line. All evergreens are impatient of drought at the time of their removal, therefore, dull, cloudy, or wet weather should, if possible, be chosen for that purpose, and a rather damp or shaded spot is the most favorable for them to be planted in. In such beds, as above directed, they should be allowed to stand for two years to gain strength; at the end of which period they should again be taken up, and planted in lines at a greater distance, where they should also remain for two years; at the expiration of which time, many of them will be in a fit state to plant out permanently in the shrubbery or plantations. The smaller ones being selected, should again be planted in lines at least fifteen or eighteen inches distant, and from a foot to fifteen inches apart in the line, which will be sufficient room for them to attain a size fit for the final planting.

The holly, under all circumstances, is a slow-growing tree, and although it bears transplanting, while young, with safety, it nevertheless is very considerably checked in its growth by being removed, unless very great care be taken to remove it with a large ball. This is not always practicable, as the soil in which the holly delights, which is of a light and rather sandy nature, little of the surrounding mould can be taken up with the roots. Dull damp weather should therefore be chosen, and April, August, and September, may be considered the best seasons; although holly, as well as most evergreens, may be removed at any period of the year, for particular purposes, except only while they are making their young shoots. Puddling the roots should never be neglected; and when they are planted, a liberal supply of water should be given them, both at their roots and also over their heads, unless the weather should be sufficiently wet to render such labour unnecessary. Wet weather should therefore be chosen for planting all evergreens; and if only ordinary care be taken in removing the

plants, little doubt can be entertained of success. Hares and rabbits are very destructive to this plant; and as it is some years before it attains a size sufficient to protect itself against their attacks, some defence or other should be devised for their protection. The ground also where they are planted should be kept clear of weeds round them, which, if not attended to, will, in many cases, completely check them. Hollies succeed well under the shade of other trees, and to a certainty are more successfully planted in such situations than when fully exposed to the rays of the sun; and when planted in the park, or in exposed situations, a two-fold benefit may be obtained by surrounding them with a close-wattled fence, both for the purpose of defending them from the attacks of hares, rabbits, &c., and also to afford them a partial shade until they be completely established; after which, few trees are more hardy and capable of defending themselves against their enemies.

A curious physiological circumstance has been often noticed by botanists in regard to this tree, which is, that it is furnished with prickly leaves near the ground, and entirely smooth ones towards the top, when growing in situations which render it liable to the attacks of deer or other animals. The large hollies in Needwood Forest are described to be of this sort, and are armed with prickly leaves for about eight feet high, which would seem to imply a consciousness in the trees, that when their branches were out of the reach of the deer, they had no occasion for arms.

Holly-plants, for the purpose of making hedges, should be planted as such, when they have been nursed for two years from the transplanted beds, that is, when they are four years old. In planting them, they should stand at the distance of nine or ten inches apart; and if protected for the first five or six years, will, soon after that, under good management, defend themselves from all attacks, and make excellent fences, affording shelter, as well as a boundary either to fields or plantations.

The holly attains a large size both in height and girth of stem, and specimens are to be occasionally met with above six feet in circumference. The value of the timber of such trees

is very great, although few who are possessed of such trees will be induced to fell them, unless under peculiar circumstances.

The remains of considerable sized forests of holly are to be seen in some parts of Aberdeenshire, on the banks of the Dee, and also at Gordon Castle, in the adjoining county. An interesting account of these trees is given by Mr. Sabine, in the Horticultural Transactions, who was particularly struck with their venerable and magnificent appearance. The timber is as white as ivory; it is often used as a substitute for that article, in inlaying and veneering, and is in much request by the makers of mathematical instruments and turners. The well-known glutinous substance, bird-lime, is made from the bark of this tree when freed from the woody fibre.

Hornbeam.—(*Carpinus Betulus.*)

This tree is also a native of Britain, and is found naturally in a variety of soils and situations, and prospering in every one which is capable of being planted. It is, however, far less prevalent in our woods and plantations than almost any other of our indigenous timber-trees; and this circumstance has been accounted for in the following manner:—In the early years of horticultural improvements, hornbeam-hedges were much in fashion, and nurserymen then propagated them from layers, which was judicious enough for the purpose for which they were then intended; but from such layers, fine trees never could be expected, and hence the majority of those which were planted with a view to attain the size of timber-trees continued meagre, straggling, deformed bushes, and few of them ever attained any useful size. Miller reprobated this mode of propagation, and since his time, the hornbeam has been more generally originated from seeds, and now we find fine specimens of trees of that age; but as a forest-tree, it appears to be still too much neglected. The general character of this tree resembles that of the beech; the timber is also very similar, and is applied to every purpose for which the beech is used; indeed, for millwright's work, it is considered superior. As has been already observed, it is increased by seeds, which

ripen in September and October, in great abundance, in the English woods, but rarely, if ever, in Scotland. The seeds should be sown as soon as gathered, in beds of the ordinary sizes, and in almost any tolerably good nursery-ground. Many of the seeds will vegetate the first year after sowing, and all of them the second. When the young plants are sufficiently strong in the seed-bed, they should be carefully removed and transplanted into nursery-beds, or lines, as already directed for beeches, their whole nursery culture being similar to that of that tree. As to final situation, the hornbeam is not particular in its choice of soil, nor of situation. However, in common with every other tree, it will attain a greater bulk sooner in good soil and sheltered situations. It is not much planted as a forest-tree, but evidently deserves to be more attended to. As a copse-underwood, it is valuable, and affords excellent shelter for game, for, like the beech, the half-decayed leaves remain on the trees till spring. It also yields a considerable bulk of fagot-wood, and makes excellent fuel, dead-fences, and hurdles.

There are several varieties which are met with in cultivation, but they can only be considered as merely ornamental, and as such deserve a place in the arboratum or shrubbery.

The varieties are multiplied by grafting on the common sort, and the true exotic species *C. Americana* and *Orientalis*, are increased by the same means, or by seeds imported from their native habitats.

Locust-Tree.—(*Robinia Pseud-Acacia.*)

This family may chiefly be considered as ornamental, and as such deserve a place in every shrubbery of extent. The *R. Pseud-Acacia* attains a considerable size of trunk, but is more regarded in consequence of the great durability of its timber, which, if we can credit Mr. Cobbet, is almost incorruptible. This species has been long cultivated here, and some considerable sized specimens are occasionally to be met with on the lawn, and in the plantations of some of our best planted residences; but if not planted in very sheltered situa-

tions, it is apt to be broken, and the timber injured by the boisterous winds with which we are visited during spring and autumn in this country. Its flowers and foliage are peculiarly interesting and beautiful; but, as an ornamental tree in its general outline, it cannot be allowed much merit. Its leaves are late in spring before they appear, and they fall again early in autumn. It is of rapid growth while young, and better calculated for copse-wood than for forest planting. It is a native of North-America, where it is much prized on account of its durability; and for gate-posts, palings, and similar purposes, has considerable merits, and may be advantageously planted with us. It is not likely ever to become a timber-tree of the first class in this country; but in North-America it attains a large size, and the wood is esteemed by the cabinet-maker more than that of any other timber whatever. It prefers a deep sandy soil, and bears cutting freely, and in this way has been advantageously cultivated as a copse-tree, as appears from a communication to the Board of Agriculture.

It ripens its seed in September, by which it is readily increased, and which should be saved till spring, and sown in any moderately good nursery-ground, where it will soon come up, and will be, by the spring following, in a fit state for transplanting into nursery-lines, when, after one or two years growth, it may be planted out, where it is permanently to remain.

This tree succeeds best when planted young, for from the nature of its roots, which are long and thinly furnished with fibres, it seldom succeeds well, if planted when of a large size.

Laburnum.—(*Cytissus Alpinus.*)

The tree, or Scotch Laburnum, is so called to distinguish it from the common laburnum, with which it is often confounded, but which are very distinct species, the latter only attaining the size and character of a straggling large shrub; whereas the former attains that of a considerable sized tree. They are both natives of Europe, and have long been cultivated in this country as plants of ornament; the former, how-

ever, is also valued for its timber, which is much prized by the cabinet-maker and turner for its hardness, beauty, and durability. It is the false ebony of the French, and is sometimes used as a substitute for that wood by the British artists. No tree which is cultivated in our plantations has greater claims on our attention as a tree of ornament, either planted on the skirts of plantations, or on the lawn, or in the park. When planted with a view to produce timber, it should be intermixed with other trees, and attention paid to training it up to one proper stem; it is not slow in growth, and will, in favorable situations, attain a large size in thirty years. Sang records an instance of this timber being sold at a public sale, in 1809, as high as half-a-guinea per foot; and gives another instance, in 1806, of its being sold for seven and sixpence,—a price which no other timber that is produced in this country would ever be expected to bring. The tree laburnum is propagated by seeds, which ripen yearly in great abundance. It is in perfection in October, and is easily distinguished from the common or shrubby sort, by the largeness of its leaves and flowers, as well as by its attaining the character of a tree, while the other attains only that of a shrub. It is difficult, notwithstanding, to obtain genuine seeds of the tree kind, as so little attention is unfortunately paid to the collecting of seeds in general. Whoever wishes to propagate both sorts separately, should be particular from what trees the seeds are obtained. When the seed-pods are gathered, they should be left to dry in an airy loft, and, when sufficiently dry, they should be stored by in sacks, still enclosed in the pods, where they ought to remain till the spring, when they may be taken out and sown. The end of February, March, and April, is the proper season to sow this seed, which should either be sown in drills or beds, as already noticed for haws, but they need not be so much covered. They will soon vegetate, and the spring following will require to be drawn from the seed-bed. The strongest plants may then be transplanted into lines, one foot apart, and the plants six inches apart one from another. The smaller ones may be placed in beds, about four or five inches apart.

Larch.—(*Pinus Larix.*)

The larch is a native of Alpine situations in the South of Europe. The finest trees and most valuable timber being found in chasms on the north sides of mountains, where least exposed to the sun, and where the summer may be said to be of short duration. Many opinions have been offered as to the exact date of its introduction into Britain. It appears to have been cultivated by Parkinson in or previously to 1629; and in 1664, we find it noticed by Evelyn as having attained a considerable size at Chelmsford, in Essex. Harte, in 1715, recommends it in his essays, and has left us a drawing of the tree. It is rather singular that Langley, who wrote so soon afterwards, should not mention this tree. Its introduction into Scotland is stated by Mr. Lambert to have been effected by the celebrated Lord Kames, in 1734, and planted on the Blair Drummond estate; and, in 1741, it was extensively planted by the Duke of Athol, at Dunkeld, who, according to Dr. Walker, had introduced it from London, as a delicate exotic, in 1727, along with some orange-trees, and these are said to have been kept in the green-house at Dunkeld, until their hardy properties were discovered, and then that they were planted out in the garden, where they remain to this time, and one of them has attained the great size of one hundred feet in height, and ten feet in circumference. There are, however, specimens of this tree of much larger size, in the garden of General Campbell, at Monzie, in Perthshire, the largest of which is seventeen and a half feet in circumference, and another nearly as much. The larches planted throughout Scotland, about fifty and sixty years ago, are now trees of vast magnitude, and have fully answered all the eulogiums which have been bestowed on it, so much so, that the larch is now considered, on the whole, the most useful and valuable timber-tree, not even excepting the oak. Some of these trees, on the Dunkeld property, have attained the height of one hundred and twenty feet in the space of fifty years, that is, an average growth of above two feet four inches annually; and some of them, in eighty years, upon poor hilly land,

fifteen or sixteen hundred feet above the level of the sea, have attained the astonishing size, as to produce three hundred feet of measurable timber. As to soil, the larch will flourish in every soil, "on hill, on dale or mountain, in loam, in clay, in gravel; in peat-earth, in moor-earth, amongst rocks and stone: in short, every where, excepting in standing water." There are, however, soils, in which it attains a greater size and a better quality than in others. Rich soils, in general, are unfit for the larch, but none are too poor for it; although it will grow for the first few years luxuriantly, and even attain a large size in rich soils, nevertheless, in such it is apt to decay at the heart, and consequently be rendered useless in point of timber. It is not, therefore, the soils in which this tree appears to make the most rapid progress while young that are most congenial to it, but actually the reverse; and it also appears that a certain degree of altitude of situation is necessary to produce it in perfection. The larch is not only valuable in itself when fully grown, but is the best of all trees for nursing others in bleak and exposed situations. "Indeed," says Sang, "no tree is so eminently qualified for this office. In most situations, even in the most exposed places, and thin soils, it outgrows all other timber-trees for the first ten or twenty years after planting; and if planted in sufficient numbers, in proportion to the principal trees to be nursed, it affords them good shelter; while, by its towering, it tends to draw them up for timber. It will arrive at a timber size in almost any situation or soil, (as already noticed,) and of course it may with propriety be planted on a broad and extensive scale, and may be expected to make the most durable timber on the more elevated and exposed situations, where the soil is not of a very rich quality. Certainly, had the vast forest tracts, which have been planted with Scotch fir in many parts of the country, being planted with larches, at least in those soils and situations adapted for them, the estates would have been enhanced in value; the larch bearing the ascendancy over the Scotch fir in the following important circumstances:— that it brings double the price at least, per measurable *foot*; that it will arrive at a useful timber size in one half or a third part of the time in general which the fir requires: and, above

all, that the timber of the larch at thirty or forty years old, when placed in soil and climate adapted to the production of perfect timber, is in every respect superior in quality to that of the fir at a hundred years old. The general usefulness of the larch-timber is now pretty well known in most parts of this country; it is therefore hardly necessary to enumerate the purposes to which it is applicable. It may be sufficient, perhaps, to state, that it is useful in ship-building, house-building, in husbandry, and in cabinet-making." The larch is possessed of the properties of durability to an extraordinary extent, and is therefore well adapted for piles for the foundation of bridges, embankments by the sides of rivers, gate-posts, and indeed for every purpose where strength and durability are required.

The larch, like most of the resinous trees, is better when propagated from seeds than by other means. Indeed, with this division of plants, it is a difficult matter to increase them otherwise, although some of the rarer species of *Pinus* are occasionally increased by layers, and some few by grafting. The larch produces seeds abundantly with us, not only on old trees but upon young ones also. The cones are ripe in November, December, and January, and should be collected from the healthiest and best trees. There are often cones of two years' growth upon this tree; but, in gathering, care should be taken to select those of the last year's growth. As they are gathered, they ought to be dried, so as to prevent a disposition to turn mouldy, which would injure the seeds, if allowed to go too far. When sufficiently dry, they should be laid up in a dry loft till the spring, when they will require to be taken out of the cones previously to sowing. Some, however, take out the seed during winter, but it is much better to keep them in the cones till spring.

As the process is the same in regard to taking out the seeds from the cones of all the pine or fir tribe of trees, we will, for greater brevity, detail that process under a separate head, and where it is applicable to the others, we will occasionally refer to it.

EXTRACTING THE SEEDS FROM THE CONES OF THE PINUS FAMILY.

As the seeds of this valuable division of trees are matured within a hard scaly seed-vessel or cone, it is not without difficulty that they are extracted when they are required to be sown. Of all the *coniferous* trees, the larch, Scotch fir, cedar of Lebanon, and black American spruce, are the most difficult to part with their seeds, and hence many methods have been devised and adopted to facilitate that object.

The use of fire-heat in differently constructed kilns has been very generally used, particularly with the extensive nurserymen in the North, for the purpose of opening the cones. Splitting the cones, with an instrument for the purpose, has been used to a great extent; and grinding, either by the cone-mill or common improved bark-mill, has been still more generally adopted. When the quantity of seed required is small, the most convenient method of separating them is to split the cones into four equal pieces, by means of a small triangular iron or steel instrument sharpened to a point, and having three cutting angles, put into a wooden handle like a shoemaker's-awl. In performing the operation of splitting, the cone should be held between the fore-finger and thumb of the left hand, with the smaller end or point resting on a board. The point of the instrument is inserted in the centre of the broad or bottom end of the cone, and with a slight effort, the cone is divided into two portions; the same operation is performed with each half, which leaves the cone into four equal parts. The cones, thus divided, may then be placed on a sieve before a moderate fire, and the seeds will soon drop out on a piece of paper or cloth placed underneath on purpose to receive them. The splitting of the cones is often carried to a great extent by commercial nurserymen, and as the operation is performed in bad weather, or by old people or children, the expense is always covered by the larger quantity of uninjured seeds which is obtained by this method than by grinding them, which, although more expeditious, is destructive to a large portion of the seeds. Many of the pine tribe will open their cones before a moderate fire without being split, and when

there is the conveniency of hot-house flues being kept moderately warm, seeds may be obtained in large quantities. We have often extracted considerable quantities of coniferous seeds by the simple process of placing the cones in baskets, sieves, or shallow boxes, having a large sheet of coarse paper spread over their bottoms on which the cones are placed. These are then placed on the top of the flues in the pine-stoves, vineries, or in any other house of equal temperature. Once a-day they are examined, and the seeds which have dropped out on the paper are removed and sprinkled with a little water. They are then laid on a table in the seed-room, until a sufficiency be extracted to fill a bag or drawer, when they are reserved till sown. Seeds of the larch, stone-pine, pineaster, &c., are readily obtained by this process. When the quantity to be obtained is considerable, the cone-kiln, as described by Sang, and which is the most general in use, is much to be preferred, and is as follows:—"The cone-kiln is constructed after the manner of a common malt-kiln, the bearers should be about nine feet distant from the fire, and two inches apart. A hair-cloth is spread over them from side to side of the kiln, and the cones are laid on it to the thickness of twelve or fourteen inches. A gentle fire is then applied, and regularly kept up till the cones become opened. During the time of drying, the cones must be frequently turned upon the kiln, and when the seeds begin to drop out, they must be removed to a dry barn, and sifted till all the seeds which are loose fall out, and are taken from among the cones. The cones are afterwards to be thrashed severely with flails, and sifted as before, and so on, till the seeds are taken out as completely as possible."

This we look upon as by far the most safe method of separating the seeds from the cones, and requires only care in the application of the fire-heat; which, if it be too violent, would not only scorch and dry up the seeds and render them useless, but from the quantity of resinous matter contained in the cones might set fire to the whole fabric. As an improvement upon this plan, we would suggest, as has been recommended by Sang, the operation of splitting the cones previously to their being laid on the kiln, the extra expence of this operation will be more than repaid in the extra quantity of good seed.

The use of the cone-mill, as well as that of the bark-mill, is radically bad, as many of the seeds are bruised and rendered useless that have passed through them, and this also appears to have been the conclusion drawn by Sang, who had a very extensive knowledge in these matters in the Kirkaldy nurseries, which he so long and so scientifically managed and possessed. "Indeed," he says, "among all the methods which we have known adopted, to perform the painful and laborious work of extracting the seeds of the larch, the plan of splitting them singly is infinitely the best and safest for the seeds, and ought to be adopted by every one who has occasion to use only small quantities of seed."

To facilitate the process of splitting cones, particularly such as are large, like the cedar of Lebanon, cluster-pine, &c., steeping them in water for a day or two previously to splitting them, may be advantageously adopted.

The beginning of April is a very proper time to commence sowing larch-seeds, and from that period to the end of the first week in May, but after that it may be considered too late for the purpose. The ground for the larch seed-beds should be well prepared previously to this time, that is, it should be winter-fallowed, or dug two or three times during winter, but always in dry weather. Nurserymen, of great experience, recommend as the best preparatory crop for seedling-larches, that of two-year seedling Scotch firs, or if that cannot be had, land from which a crop of two-year seedling-larch has just been taken up. If the soil be moderately good of itself, a very slight dressing of rotten manure may be given, but this should be neither rank, nor in too great a quantity. The ground should be well broken in the process of digging, and rendered as fine as possible on the surface by repeated raking; and divided into beds, which is the best form for all the fir-tribe seeds to be sown in. If the seeds be good, and have been taken from the cones by the process of splitting them, they should be sown about a quarter of an inch apart, seed from seed; but, if they have been extracted by the mill, they should

be sown thicker, as a considerable number, to a certainty, will prove abortive, having been bruised in the operation.

When the seeds are sown, they should be covered to the depth of a quarter of an inch, and previously to their being covered, a light wooden roller should be drawn over them to press the seeds firmly into the bed, as well as to place them all at an equal depth. While in the seed-beeds, larches should be carefully and frequently weeded, for, if once overgrown with weeds, they will seldom do much good, at least for one season to come, however well they may afterwards be kept. This rule is applicable to all seedling plants, and cannot be too often, nor yet too strongly recommended.

In one season after sowing, the young larches will, if all circumstances have been favourable, have attained a sufficient size for transplanting; but, as it is often desirable to have a number of two-year old seedlings, we would therefore propose selecting the strongest plants of the one-year old seedlings, which may be done with safety, if a little care be taken in the operation; and when they are taken up, they should be immediately again planted in nursery-lines, and are henceforth called transplanted trees, to distinguish them from those taken at once from the seed-bed, and planted out where they are to remain. If they are to be transplanted in the same nursery in which they have been reared from seed, no more ought to be drawn from the seed-bed on one day than it is intended to plant before night, as nothing is so injurious to young trees in general, as to pull them from the seed-beds and leave them in the sheds, probably tied up in bundles, for a week, or even a month, before they can be planted. This, however, we often see done, and by those who ought to know better, and is like many other methods which are erroneously called by them saving of labour, but which is decidedly the very reverse, and is always fraught with the most serious injury to the plants. Larches, when transplanted into nursery-lines, should be allowed at least twelve or fifteen inches between the lines, and from four to six in the line, and, during their stay in the nursery department, should be kept clear of weeds, &c. In regard to the size which the larch should be when fit to plant out, where it is to remain for timber, or for

nursing up other trees, a considerable latitude may be taken; but as a principle, which should never be overlooked, the younger they are planted out the more likely are they to succeed. Most of the deciduous coniferous trees are difficult to transplant when of a large size, whereas few trees succeed better when they are planted young, and of course of a diminutive size. Those, who have most successfully and extensively planted the larch, prefer trees not more than one year old, as seedlings, and which have been one year nursed in good ground, and those will be by that time about from six to nine inches in height, and if the soil has been good, will have an abundance of fibres; a circumstance of far more importance to their future welfare than if they were twice as large in branches. Indeed, we would say, that larches above eighteen inches in height are much too large for planting, let the ground be ever so well prepared for them, and such as have pertinaciously persisted in planting them of a larger size have been uniformly disappointed in the end.

Lime.—(*Tilia Europæa.*)

The lime is a native tree, and one of great beauty and interest, when considered merely in an ornamental point of view, and is suited either for the park, the lawn, or the avenue; indeed, for the latter purpose, it would appear that it has been chosen by common consent at least for two centuries. As a timber-tree it has few merits, being in general used by carvers, gilders, &c., as the wood is soft, and easily cut; it is also used for charcoal for making gunpowder, and the inner bark is made into bass mats, so useful in covering up garden productions, and packing of goods in general. The flowers are fragrant, and afford a great store of food for bees, and are, on the same account, often planted near the mansions of the great. Evelyn was exceedingly partial to this tree, and asserts, that the fragrance of its blossom is an admirable preventative against the epilepsy, or falling sickness.

Limes are in general increased by layers, as being the most expeditious way, but as they ripen their seeds so plentifully, we can see no real reason why such a slovenly method of in-

creasing them should be countenanced; as it is well known that trees, originated from layers, cannot ever be expected to be equal to those propagated from seeds. The lime ripens its seeds in October, and should be sown as soon as gathered, by which means the seeds will vegetate the following spring; whereas, if not sown till the spring, they would not vegetate till the following year, and consequently one season would be entirely lost. Their after management, while in the nursery, is not different from that of other trees under similar circumstances, and consequently need not be repeated.

The lime is one of those few trees that will grow freely, although planted of a large size; however, the best-sized trees from a nursery, to plant with a view to profit, are those from eighteen inches to three feet in height; nevertheless plants from that size to five or six feet, may be safely planted. As to soil, the lime is not particular; it will grow in almost all soils, but flourishes best in a deep loam where it is moderately sheltered. Indeed, the lime is not a tree that is calculated to stand in the most exposed situations, and it is seldom planted in such, at least not in this country.

Limes propagated by layers may be operated upon in spring or in autumn, and at these seasons, March and October may be considered the best. In laying limes, the various processes of tonguing, sliting, ringing, &c., are dispensed with, as the plants are found to root so freely, when laid in the more simple method of merely bending a part of the shoot, so that it may be buried about three inches under the surface, having the leading end of the shoot shortened back to one eye, and that eye only a little above the surface of the ground: this bend is so performed, that the bark is not even cracked in the process. Those shoots laid in spring, will, for the most part, be fit to remove from the stool, and to be planted into nursery-lines the spring following that in which they have been laid, and so in most cases will it be with those which are laid in autumn. When the young plants are removed from the stools or mother-plant, they should be immediately planted out in nursery-lines about two feet apart, and a foot or fifteen inches apart, plant from plant, in the line. Here they may remain until planted out, where they are to remain. The stools

from which one crop of layers has been taken, will continue, under good management, for a number of years to produce yearly crops of plants; and as these plants in favorable soils are of sufficient size for sale the year after being removed from the stocks, at least they will be larger than plants of five years growth originated from seeds. Nurserymen find a great saving in adopting this mode of propagation, but the consequence falls on the planter, who is thus filling his ground with trees which will never be equal to those which have been originated from seeds. The consequence is of far less importance if such trees be planted for copse-wood, as when cut down to the root, the future tree may, under proper training, be much altered for the better.

Maple.—(*Acer. Campestre.*)

The common maple is acknowledged as indigenous to Britain, and is found in situations which can leave no doubt of the assertion. It is not a tree of value for its timber, but is ornamental, particularly when old, and probably less cultivated than any other of our indigenous plants. It is propagated in the same manner as the sycamore, to which it is botanically connected, but which is a far more valuable tree.

Oak.—(*Quercus Robar.*)

The oak has long and justly been regarded as the monarch of the wood, and it is one of the most generally useful and highly-prized trees that abound in our forests. The oak appears to be almost peculiar to Britain, no other country excelling us either in the beauty, magnitude, or quality of our oak timber, and this has been long ago noticed by our poets, our statesmen, and historians. Although Scotland abounds with oaks, yet there are not such specimens to be met with there as in England, some of which we have measured from thirty to forty feet in circumference. Indeed, the larch may be now called the national tree of Scotland, for which that country is likely to be as famous as England has long been for the number and magnitude of its oaks. The oak is not very choice in regard to soil, for it prospers, although not with the same degree of vigour, in almost all soils, and in almost all situ-

ations. "It thrives best," Sang observes, "however, in strong deep loams, incumbent on gravel or dry rock; but in all soils, in which there is any considerable proportion of loam, it will thrive in a greater or less degree. In low situations, where the soil is deep and moist, it grows rapidly, and attains to a great size; but in such places it is found to decay sooner than it does in a more elevated situation, with a drier soil. In light soils of little depth, although it grows slowly, it becomes firm in texture: and the timber, though smaller in size, acquires a state of maturity sooner than that grown on more cool and retentive soils. In deep cold sand it will root firmly, and arrive at a great size. In clay, incumbent on till, to which all other trees, excepting the beech and the sycamore, have an aversion, the oak will grow, and produce useful timber." In good soils, and in sheltered situations, the oak will make the most progress, and will keep pace with many other kinds of trees; whereas, on poor soils and in bleak exposed situations, its progress will be but slow. In planting young oak plantations, therefore, it is necessary to plant other trees of a hardier nature as nurses, to shelter and draw up the oaks, which, without this assistance, would never attain the character or habit of fine timber-trees. The best tree to use for nursing up oaks is evidently the larch, which is a rapidly-growing tree, as well as a profitable one, even while in its young state. The oak is propagated only by seeds when the end in view is to propagate extensively; but the scarce varieties and species of exotic oaks are and may be increased by grafting or inarching upon the common kind.

The seeds of the oak are known by the name of acorns, and ripen every season in more or less quantities in England, and are in proper condition for being gathered about the middle of October. Acorns were the food of the early race of mankind in almost every part of the temperate world, and in the days of Strabo the inhabitants of the mountainous parts of Spain ground them into meal. In times of scarcity they have been ground and made into bread, both in this country and in many parts of the continent of Europe. "The study of Botany, and the encouragement given to agricultural and horticultural pursuits," Philips sensibly observes, "have so wonderfully improved the state of this country, that what in

early ages a king would have feasted on, the beggar now refuses, and the acorn is scarcely known as affording nourishment to the human species, even among the wandering vagrants who pitch their tattered tents, and cook their scanty fare beneath the branches of the trees that produce them.

" Acorns continued to be of so much importance, for many ages after they had been relinquished as the food of man, that a failure of them frequently caused a famine, as the swine, which our woods and forests maintained, formed a principal part of the food of our ancestors. The author of the Saxon Chronicle, after describing the extraordinary famine and mortality of the year 1116 records particularly the failure of masts in that year.

" We find that, as early as the end of the seventh century, our Saxon ancestors had a law, and particular directions given them by King Ina, respecting the fattening of swine in woods, since his time called *pawnage* or *pannage*. Elfhelmus reserves the pannage of two hundred hogs for his lady in part of her dowry; and acorns are particularly mentioned about the middle of the eleventh century, in a donation of Edward the Confessor.

" Before the Conquest, the Wealds of Sussex were one continued forest from Hampshire to Kent, principally of oak-trees, that were only valued by the number of swine which the acorns maintained; and so accurately was the survey taken in William the Conqueror's time, that woods are mentioned in Doomsday Book, of one hog." The Romans, in the time of Strabo, were supplied principally with hogs fatted in the woods of Gaul, and with us, to this day, acorns are used for the same purpose, as well as for the fattening of deer.

Acorns are often sown immediately after being gathered, and in that way succeed perfectly well; they are also often kept in sacks or on a dry floor till February, when they are also sown with nearly the same success. In gathering the seeds, choice should be made of the finest specimens of trees, which has been already noticed, as they are more likely to produce a healthy and vigorous progeny than those which are ill grown and stinted in their growth.

At whatever season the seeds are sown, whether in autumn or spring, a much less difference will attend the result than is allowed by some; if the seeds have been carefully selected,

and the ground properly prepared for them, plants from either sowing may be expected to prosper equally well. It is important that the ground be sufficiently prepared for the reception of the seeds, for if it be not done now, it cannot be done afterwards. For this purpose, it should be deeply and finely dug, and rendered fine and smooth by the use of the rake, and if the ground be not in a tolerably rich condition, we would recommend a moderate supply of well-rotted manure.

The acorns may either be sown in beds or drills, but the latter is by far the better way where the intention is to allow the seedlings to stand more than one season before transplanting, that is, in the seed-bed. They should be equally distributed either in the drill or on the bed, at about the distance of half an inch apart from each other, or rather more, and covered to the depth of two inches.

After sowing, a watchful eye must be kept on the beds or drills, to guard them from the attacks of mice or rats, either of which would be equally destructive to them before they begin to vegetate. Traps should be thickly set over the ground, and other means adopted to keep under such destructive enemies.

The general routine of nursery culture, as to transplanting into nursery-lines, beds, &c., is the same as has been detailed for other forest-trees already noticed; any reference, therefore, at present, to that part of their management, may be deemed superfluous.

A tree of so much national importance as the oak, deserves our greatest care in rearing and finally planting out. Many plant at random, and never think that different species of timber-trees require different soils to bring them to the greatest degree of perfection, but such is the case; and where adapting the trees to the soil and situation has been attended to, the result has been highly satisfactory; whereas, a total neglect to such arrangements has been attended with disappointments. Upon this subject Sang offers the following rational observations, which, we may add, are in accordance with our own:—"We are clearly of opinion," says he, "that the best method is to plant each sort in distinct masses or groups, provided the situation and quality of the soil be properly kept in view. There has hitherto been too much random work carried

on with respect to the mixture of different kinds. A longer practice, and more experience, will discover better methods in any science. That of planting is now widely extended, and improvements in all its branches are introduced. We, therefore, having a better knowledge of soils, perhaps, than our forefathers had, can with greater certainty assign to each tree its proper station. We can, perhaps, at sight decide that here the oak will grow to perfection, there the ash, and here again the beech; and the same in respect to other trees.

"If, however, there happen to be a piece of land, of such a quality that it may be said to be equally adapted for the oak, the walnut, or the Spanish chestnut, it will be proper to place such in it in a mixed way, as the principals; because each sort will extract its own proper nourishment, and will have an enlarged range of pasturage for its roots, and consequently may make better timber-trees.

"Although by indiscriminately mixing different kinds of hard-wood plants in a plantation, there is scarcely a doubt but that the ground will be fully cropped with one kind or other; yet it very often happens, in cases where the soil is evidently well adapted to the most valuable sorts, as the oak, perhaps that there is hardly one oak in the ground for a hundred that ought to have been planted. It not unfrequently happens, too, that even the oaks, or other hard-wood trees which are to be met with, are overtopped by less valuable kinds, or perhaps such as, all things considered, hardly deserve a place.

"Such evils may be prevented by planting with attention to the soil, and in distinct masses. In these masses are insured a full crop, by being properly nursed for a time with kinds more hardy, or which afford more shelter, than such hard-wood plants.

"There is no rule by which to fix the size or extent of any of these masses. Indeed the more various they be in size, the better will they please the eye of a person of taste when grown up. They may be extended from one acre to fifty, or a hundred acres, according to the circumstances of soil and situation: their shapes will accordingly be as various as their dimensions." In regard to the size of oak trees at their time of planting, opinions are at variance, some advocating plants

of a considerable size, and others such as are quite small and young, while a third recommends sowing or planting the acorn, where the future tree is intended to grow. Large plants of any tree cannot be with propriety planted to any extent, when the object is profitable planting; and too small plants are also, in many cases, objectionable, particularly when the surface is rough, and the ground not prepared by ploughing or trenching.

Oaks, that have stood two years in the seed-bed, and which have been afterwards planted out into nursery-lines for one year more to strengthen, may be considered the best of all plants for successful planting, and at that age are better furnished with fibres than when of a greater size or age. Next to these, we would say that the oaks which have been transplanted from the seed-bed, when one year old, into nursery-lines, and left in them for two seasons to attain strength, are the best.

There are above forty species of oaks introduced into this country, all of which are timber-trees in their own countries, but are of too slow a growth, or of too delicate a nature, to attain a profitable size in this country. The two native species, the *Quercus robar* and *Q. pedunculata*, are by far the most valuable; and to them may be added, if planted in favorable situations, the Turkey oak, *Q. cerris*, which promises to become a most valuable addition to our forest timber-trees. Little attention has hitherto been paid by the collectors of acorns, to distinguish between the two British species above; but this, like the gathering of seeds in general, is committed to those who know or care little about the matter. This, however, deserves attention, as the merits of the *Q. pedunculata* are evidently much greater than those of the *Q. robar*, and is readily distinguished from the latter by the circumstance of the acorns being placed on long foot-stalks, whilst those of the *robar* are nearly *sessile;* and, independently of the superior utility and hardness of the timber, the pedunculated oak is, in fact, the most magnificent of the two British sorts.

Pine.—(*Pinus.*)

Of this very useful and interesting family there are about fifty species introduced. The greater part of which are, however, cultivated only in a botanical point of view. The spe-

cies cultivated for timber are the *P. Sylvestris*, or Scotch fir, *Pinus Larix*, already noticed, *Pinus Picea*, silver fir, and *Pinus Abies*, or Norway spruce fir. It is, however, very probable, that some of the other species may be worth cultivation, as they appear abundantly hardy, and the timber appears to be equally valuable, when of sufficient age and size. Of these, the Scotch fir (*Pinus Sylvestris*) is by far the most generally planted, if we except the larch, either with a view to attain a timber size itself, or to nurse up other trees of a more valuable nature.

SCOTCH FIR.

This is probably the most hardy tree indigenous to our country, and is found, although in a stinted state, throughout the North of Europe, almost within the limits of perpetual snow, and is also found within the tropics. It appears to be naturally an inhabitant of barren mountainous districts, and in such is found to flourish much better than in more fertile and sheltered valleys. In rocky, sandy, or the most barren kinds of soils, its timber becomes most valuable, both in durability and beauty, and trees, self-sown, are, for the most part, preferable to all others. The Scotch fir, like the larch, is only to be found in perfection in the highlands of Scotland; and in that country are still to be met with the remains of forests of a very ancient date. The proper soil and situation for this tree are, according to Sang, "on the sides of mountains, in dells and hollows, among stones and rocks, beside rapid rivulets or mountain torrents, it is found in high perfection; and if it stand single, it is of great beauty. In many parts of the Scotch highlands, where the soils are extremely various and much mixed, the Scotch fir has arrived at a good size, and often attained remarkable dimensions. In any kind of soil, from a sand to a clay, provided the substratum be rubble, or rock, it will grow and flourish: but, in wet, tilly soils, it ought never to be planted: because, wherever the roots have exhausted the turf or upper-soil, and begin to perforate the subsoil, the tree languishes and dies." It will, however, grow, and indeed flourish, in almost every soil and situation, if not too rich, but not with the same degree of vigour; neither will

the timber, in such, be alike valuable. How it attained the name of Scotch fir, is difficult to say; for we do not find it to be a native particularly of that country, but also of most parts of Europe, Asia, Africa, and America, and is found in perfection in the torrid, temperate, and frigid zones.

"It may, indeed," as Ponty observes, "be called the Planters' Forlorn Hope, as, where it fails, the case is truly desperate. For instance, it is planted with success on the most barren commons, where no other tree nor plant (the heath excepted) will grow. On sites, which are elevated and exposed to particular currents of wind, it often proves the only tree that can be got up, except so far as others may rise under its shelter. In the sea-breezes, too, it is frequently observed, that while every plant around it bends to the blast, as if seeking protection, this holds its head erect, and bids defiance to the noxious gale."

As a nurse, no other tree equals the Scotch fir, and, like the larch, it will become a large and valuable timber-tree, in soils and situations where no other tree would at all succeed. The disrepute into which this tree has fallen, of late years, is probably more to be attributed to the planter than to the tree. In soils, capable of bringing the oak, ash, chestnut, and similar trees, to perfection, it would be wrong to plant this fir, unless, as a nurse-tree, to be cut out while young, while it may, with every propriety, be planted with a view to produce timber-trees, in soils and situations decidedly unfit for either of these to prosper in. Choosing fit soils and situations for different trees to be planted in has been too little attended to, and the erroneous practice of planting trees promiscuously in the same plantation, whatever the soil may have been, has, we think, been attended with sufficient disappointments to convince the observing planter of the truth of this assertion. The most successful result will always be from such plantations where the kinds of trees have been suited to the soil and situation.

The Scotch fir is increased most readily by seeds, which ripen in cones, annually, in December and January, and should then be gathered and laid in a dry loft or barn till the seeds are to be extracted from them, as has been directed for larch.

The seeds of various species of the *Pinus* family will retain their vegetative properties for two or three years, if left within the cones, but soon lose that property after being extracted from them. Nurserymen, therefore, seldom take out the seeds until near the time of sowing, and, in a great measure, calculate upon securing a crop of firs by strictly attending to this point. In April, the seeds should be sown in beds of any convenient breadth, in ground which has been previously prepared by digging, &c.; and if the ground be poor, manure should be added; but if manured for a light previous crop, it will be better. Ground, upon which a crop of peas has been grown the preceding summer, or any other kitchen-garden vegetable, excepting carrots, will be very suitable for a crop of seedling firs. The ground should be well broken in the process of digging, and should be raked as that process proceeds. When the beds are laid off, the seeds should be regularly sown on them, so that the plants may come up about a quarter of inch from each other. It is very necessary that care be taken in covering the seeds, that they be not buried too deep, nor yet left too near the surface; upon an average, half an inch may be considered the proper depth at which they should be covered. After the seeds are sown, a watch should be kept over them, as they will be liable to be destroyed by birds of various kinds; the usual methods of protecting seeds in gardens should be had recourse to, and persevered in, for if the birds once find their way to the seeds, it will be no easy matter to keep them off. When the seeds vegetate, and are a little advanced, they should be carefully gone over and hand-weeded, for, however trifling this may appear, nothing is so injurious to crops of young firs, than to allow them to be overrun with weeds in the first stages of their growth. The earlier this work is performed, the less injury the crop will sustain, and the less time it will take to perform. "A thick rising crop of seedlings," says Sang, "is often converted into a thin one by delaying the weeding: while a thin crop is much improved by a timely and continued attention to weeding. A nurseryman who can neglect his young trees in the above respect, or even walk through his grounds when his young plants languish under weeds, without the severest compunc-

tion exciting him to relieve them, is in no respect entitled to the name which he assumes."

Scotch firs are sometimes transplated from the seed-bed, when one year old, and put out into nursery-lines, in which they generally remain for two years; but more generally they are allowed to remain for two seasons in the seed-bed, and are then put out into nursery-lines for one year: at the end of that time they are in excellent condition for final planting out. When Scotch firs are allowed to stand more than two years in the seed-bed, they are entirely spoiled, and should seldom be allowed to stand more than one in the nursery-lines. The ground into which young firs are transplanted should be in good condition, and not exhausted by previous crops, and, indeed, if a light manuring be given it previously to their planting, they will be benefitted thereby. During their nursery culture, attention should be paid to keeping them clear of weeds, and in transplanting them to allow not less room than one foot between the lines, and the plant from plant in the line half that distance. When they have been for one year in the nursery-lines, having been transplanted when two-year old seedlings, they will be (if the ground be in a proper state) in much better condition for planting out than at any other age. This tree does not succeed when planted large, and few succeed better when of a proper size and age. Towards improving the quality of this timber, some attention should be paid to the trees from which the seeds are collected. The fir, like most other vegetables, which are continually originating from seeds, must be sporting into varieties, some of which have greater merits than others. This circumstance has given rise to a variety of opinions as to whether there be not several distinct species confounded under the general name of *Pinus Sylvestris*, or Scotch fir.

Amongst the most eminent of those who entertained that opinion was the late Mr. Don, of Forfar, who, in a very excellent paper in the Mem. of the Caledonian Horticultural Society, Vol. II. p. 121, describes several varieties; and we find that notice has been taken of the red-wooded variety by the celebrated Earl of Haddington, who may be considered the father of planting in Scotland. Others again deny the

existence of distinct species, or even varieties, and assert that soil and situation are all that are concerned in the matter. Soil and situation have certainly great influence on the quality of timber, and probably, in no other case, so much as the one in question; but that there exist numerous varieties, if not distinct species of pines in our forests, we think few reasonable men will deny. As a consequence, which must then naturally follow, some of these varieties are better in the quality of their wood than others, and when such can be ascertained, the preference certainly should be given to them, and we doubt not that, by these means, the quality of Scotch fir timber might in future be much improved. The variety preferred by Mr. Don, in the above communication, "is distinguished by the disposition of its branches, which are remarkable for their horizontal direction, and for a tendency to bend downwards close to the trunk. The leaves are broader and shorter than the common kind, and are distinguishable at a distance by their much lighter and beautiful glaucous appearance. The bark of the trunk is smoother than in the common kind. The cones are thicker, and not so much pointed." That distinguished botanist considered this variety as much more hardy, that it grows freely in almost all soils and situations, and that it arrives at a considerable size much sooner than the common sort.

SILVER FIR,

Is a native of the Alps and Germany, and is ascertained to have been cultivated in this country in 1603. It is of very rapid growth while young, exceeding all the pine tribe in this respect, excepting the larch; it attains a very magnificent size, and is peculiarly interesting in an ornamental point of view. Beautiful specimens are to be seen at Woburn Abbey, which were planted by Miller, and at Cranberry-house, and other places. It attains the height of upwards of one hundred feet; and one of the trees at Woburn exceeds nine feet in circumference, four feet from the ground, and has a clean pruned trunk of seventy-five feet. The timber of this tree is in perfection when about forty or fifty years old, and is equally

valuable for most purposes to any other tree of the tribe. In regard to soil and situation the silver fir is not so particular as has been supposed, and is found to succeed on very opposite ones. "In a loamy soil, and elevated situation, (as at Castle Howard,)" Sang observes, "on a sandy or gravelly hill, (as at Woburn,) and in clayey soil, incumbent on till, on a high situation, (as at Panmure,) the silver fir has arrived at a very large size." This tree has not hitherto been much planted merely for its timber, having been considered rather as an ornamental tree than a useful one, but there can be no doubt of its deserving the attention of planters, as the rapidity of its growth, and the value of its timber, which is not liable to warp, are equal to that of any other of the pine tribe.

The cones of the silver fir ripen in October, and should be gathered as soon as ripe, for if left longer they are apt to open and give out their seeds. When gathered, they should be stored by in a dry loft till spring. In April, the seeds should be taken out of the cones and sown in beds in land of a mellow texture, and not exhausted too much by previous crops. In regard to the quantity of seed, it should be regulated in sowing so that the plants may come up about three to a square-inch, or if hardly so thick, the crop may be reckoned sufficiently plentiful. In covering, the necessary precaution must be taken that it be done in a careful and regular manner, so that all the seeds may be of an equal depth; for when this is not attended to, some will be buried too deep, while others will not be deep enough, and both are thereby alike liable to be destroyed. The covering should not be less than one inch in thickness, and when laid on the bed, should be smoothed with the back of a rake, to give the whole a neat and finished appearance.

Silver firs should be allowed to stand two years in the seed-beds, and during that time they should be kept entirely free of weeds. When planted out at that age into nursery-lines, they should be allowed at least nine inches between the lines, and the plants six inches apart in the line, if the intention be for them to remain only for one year in that state; but if they be intended to remain for two years, they should be allowed two-thirds more room. The silver fir, from its habit of growth, requires more room than most others of the same family; and

if they be stinted for room in the first instance, they seldom, if ever, recover. The silver fir requires at least to be nursed for two years from the seed-bed, before it be in a fit state for final planting out, although some plant them when only one year nursed; and, at that size, adopt the slit-method of planting. We would, however, recommend giving them not less than two years in the nursery-lines; and when planted out, to be pitted, as a more likely way of ensuring success. This fir, like most ever-greens, may be safely transplanted at a considerable age and size; but when the object in view is profitable planting, those of the above size will be found, under most circumstances, to succeed the best.

Spruce Fir or Norway Fir.—*(Pinus Abies.)*

Is a native of the north of Europe, and is particularly abundant in Norway, and is imported by us from that country under the name of white deal. It is supposed to have been cultivated in this country about 1548, and has been, and continues to be, very generally planted in all parts of the British empire. It is one of the loftiest of our hardy trees, and has been known to have attained 150 feet in height.

This is a valuable tree, considered as a nurse for protecting other trees, as it is extremely hardy, and being ever-green, is calculated for affording a better shelter than the larch, and equally, if not better, than the Scotch fir; but it excels the latter in being much more valuable in its young state, and is peculiarly adapted for masts, spars, scaffolding poles, &c., as its habits in general, whether growing in groups or individually, is perfectly straight and erect.

When grown into a timber size, it is inferior to that of the Scotch fir in durability and bulk; and being often knotty, is less fit for supporting horizontal pressure. In regard to soil and situation, the spruce is by no means difficult to be accommodated; it will grow and thrive in soils of very opposite qualities. It, however, succeeds best in deep loams and low situations. In sheltered situations where the soil is middling good, the timber becomes most valuable. The seeds of this fir are abundantly produced, and ripen in December, at which

period they should be gathered and kept in the cones till April, when they should be taken out and sown in every respect as already noticed for Scotch fir.

Balm of Gilead Fir.—(*Pinus Balsamea.*)

Is a native of America, of much smaller and more delicate habits than the silver fir, and of little value as a timber-tree. It is not unfrequently cultivated round the skirts of our plantations and shrubberies as an ornamental tree; and for such situations it is not unaptly calculated, as the tree, during summer, sends out a pleasing turpentine odour, and the resin oozing from the cones has a singular appearance.

In its native country, this species attains the size of a considerable tree; but is not likely ever to become an inhabitant of our forests in the character of a profitable timber-tree. Its seeds ripen freely with us, and should be taken out and sown as directed for silver, and other trees of the same genus.

American Spruce Firs.—(*Pinus Nigra, Alba and Rubra.*)

These three species are natives of America, and abound in that country in many different soils and situations. They are imported by us in great quantities annually, under the name of American pine, to distinguish it from Memel or Baltic timber, which is the wood of the Norway spruce.

Of these the black spruce, *P. nigra*, is considered the best and most durable, and is much used in American ship-building. The timber of the red spruce, *P. rubra*, is much prized for sail yards throughout the United States; and, indeed, for the same purpose it is imported into Liverpool from Nova Scotia. Sang asserts that the white spruce, *P. alba*, is a very hardy tree, and will thrive better, and make finer plants in exposed situations than the common or Norway spruce. "It can hardly be admitted," he says, "as a border-tree in a shrubbery or small plantation, because it quickly attains so great a size, and offers to make valuable timber. It is now pretty generally raised from seeds, and is sold in most of the nurseries as a forest-tree." The red and black spruces have been treated with unjust con-

tempt, in consequence of their being in general propagated by layers; a mode of propagation, of all others, the most likely to bring into disrepute any tree, whatever its natural merits may be. The seeds of these species are readily procured from America, and such only should be used in the production of young plants.

In regard to soil and situation, the American spruce will thrive in moist loamy soils and somewhat sheltered situations; yet, in light and dry soils, it attains a considerable size, provided shelter be but very moderate. The white spruce should be allowed to remain for two years in the seed-bed; and when transplanted into nursery-lines, should be allowed a foot distant between the lines, and six inches between plant and plant in the line; and in such lines they should remain for two years, by which time they will, under reasonable circumstances, have attained a size fit for final transplanting. Seeds of this species often ripen in this country, but those from America are always to be preferred. The cones of the black and red spruce also ripen but rarely; therefore the nurserymen chiefly depend on seeds from their native country. The seeds are not difficult to be taken out of the cones; and, indeed, if laid on the floor of a room, spread on paper or cloths before a moderate fire, the seeds will, with little difficulty, be extracted.

When sown in April a rather damp, and somewhat shaded spot should be chosen for them; and when they have been up for two years, they should be taken up from the seed-bed and transplanted into lines, where they should remain two years longer, when they may be considered fit for planting out.

Cedar of Lebanon.—(*Pinus Cedrus.*)

The cedar has always been considered a most valuable tree, but with us it can be considered scarcely in any other light than that of an ornamental one, although there are many specimens in this country of a large size; still the time which they require to attain that bulk is so long, that they are not likely ever to be planted with an eye only to profit. As an ornamental tree no other excels it; and in situations moderately sheltered, it may be obtained in considerable perfection. It is a native of the

coldest parts of the mountains of Libanus, Amanus, and Taurus, but is not now to be found in those places in any great abundance. We are informed by Maundrell, in his journey from Aleppo to Jerusalem, in 1696, that he could reckon only sixteen large trees of this kind, one of which was twelve yards six inches in circumference, and thirty-seven yards in the spread of its boughs. It is calculated that there are now many more cedars in England than in all Palestine, although only introduced in 1683. The oldest specimens are supposed to be the two in the Apothecaries' Botanic Garden at Chelsea; but there are some of much greater dimensions in various parts of England. Zion House, Whitton Park, Stow, Warwick Castle, and Pain's Hill, are all noted for the size of their cedars; and we have reckoned above one hundred trees in the park at Claremont alone, the majority of which are supposed to have been planted by Lord Clive, and have attained a very considerable size. The cedar ripens its seeds in many parts of England, and from such seeds plants are often obtained; but the best seeds are procured from the Levant, and seldom are found defective, as the seeds will keep quite safe in the cone for several years after being taken from the tree. In regard to such cones as are procured in this country, the seeds should be extracted in spring, by splitting the cones with a triangular instrument; and to facilitate this process the more, the cones may be steeped in water for a day or two before the splitting commences.

The seeds of this tree, unlike that of almost all other trees, are improved by keeping for a time; at least it is found in practice to be beneficial to allow them to lie by for one year at least after gathering, during which time the seeds, which are quite soft when taken from the tree, become hard, and the rosin with which the cones are so fully charged, is gradually discharged. When the seeds are taken from the cone, they should be immediately sown in boxes or pans, in properly prepared light loamy earth, and covered to the depth of half an inch; or they may be sown on a well-sheltered border, in a similar soil, and kept clear of weeds after they come through the ground. When one year old, they should be transplanted into nursery-lines, in which they should remain for two years to gain strength; and afterwards, if they be taken up and replanted carefully

at greater distances, they will, from thence, be fit to plant out, where they are permanently to remain.

The cedar, in most soils, makes few fibrous roots; hence the difficulty of getting large-sized plants to succeed, and small plants, although ultimately they will out-grow such as may have been planted of greater size, are not always profitably planted, as it is several years before they can at all protect themselves. To remedy this defect, as well as to have a supply of good-sized trees on sale, the best nurserymen grow them in pots from the time they are sown until they are planted, at probably a height of six or ten feet. The seeds are sown in pans, and when fit for removal, are potted into small pots, one plant in each; as they grow, they are repotted into larger pots, and their leading shoot carefully trained as it advances, so that fine trees may be obtained of a large size; and the roots being well supplied with fibres, and the ball compact, they may be planted or sent to a great distance with perfect safety. The cedar, like most of the pine family, does not thrive well in the vicinity of large towns: the proper situation for all the species is that of an elevated spot and pure air.

Weymouth Pine.—(*Pinus Strobus.*)

This species is a native of America, and forms the connecting link between the pine and larch tribe. It is a valuable timber-tree in its native country, and attains the height of one hundred feet, but is by far of too delicate a nature ever to lead us to expect it will be beneficially planted here, unless in situations peculiarly sheltered and warm. From its well-known merits as a timber-tree, it has been extensively planted in many parts of the kingdom, but we are not aware of its having succeeded to any useful extent. It was introduced in 1705, and very rapidly spread over the empire, as it was then supposed to be the most valuable tree of the genus, next to *P. Sylvestris.*

The Weymouth pine ripens its seeds in this country, although it is not sufficiently hardy to become a large or useful tree. The seeds are ripe in October, and should be gathered without delay, as they are very liable to drop out of the cones, if left too long on the trees. When collected, they should be laid up in

a dry loft till spring, when the seeds may be taken out and sown in April, in beds of mellow ground, where they should remain not more than two years, and should not be transplanted sooner. A half humid soil is the most favorable for them while in the nursery; and a period of two years nursing in lines fits them for final planting out, where they are to remain. The elegance of this tree renders it admissible into all ornamental plantations. As a single tree, in a sheltered rather damp situation, it becomes a large and handsome tree; but it is only in the grove, when planted closely together, that it is to be looked for as a tree of value. Indeed, such is the case with all the fir tribe, to have fine clean timber-trees, they must be closely planted, so as to shelter, draw up, and prune each other.

It is successfully transplanted when of a considerable size, but always succeeds best when planted out for good when about four years old from seed.

The remainder of this family that are likely to be profitably planted, are the pinaster or cluster pine, (*P. pinaster*,) and the stone pine (*P. pinea*); but as neither is equal to those already noticed, we may merely observe that as both ripen their seeds with us about December, their gathering, sowing, and nursery culture are the same as that already laid down for the other species of the *Pinus* genus. The former was introduced in 1596, and the latter in 1570. Its seeds are esteemed a delicacy by the Chinese, as well as the natives of the south of Europe, and appear in their ripe state as an article in their choicest desserts.

Sycamore, or Plane.—(*Acer-Pseudo-platanus.*)

Is an indigenous tree, and attains a magnitude equal to that of any other of our native trees, and although more tame in its outline and form than the oak, is nevertheless a handsome park tree. It attains a large size in almost all soils which are not over wet, and in almost all situations. In poor dry soils it attains a valuable size; but in a loamy soil becomes very large within a century. Sang says it outlives the ash in elevated situations, and becomes of a very large size in alluvial soils of a

sandy nature. It attains a great age, and is, in that respect, perhaps, next to the oak and yew in point of longevity. Sang instances the *Prior-Letham Plane*, a tree of some notoriety, being one of the *two* trees discovered in Scotland by Dr. Johnson in his Northern Tour. This tree has attained the amazing bulk of twenty-four feet eight inches in circumference at the surface of the ground, and at the parting of the branches nineteen feet. The trunk is twelve feet high, and at that height divides into ten large branches, each equal to a considerable sized tree. It is mentioned in a lease that was granted of these grounds nearly two hundred years ago, and is there called "the large Plane," and cannot probably be less than five hundred years old. The plane succeeds in all ordinary soils and situations, and is, with the elder and larch, the best deciduous nurse plant we have. It is well calculated for a hedge-row tree, as it affords more shelter when grown up than any other tree. It is a quick grower, and will endure the sea-breeze better than any other tree, nor is it liable to grow to one side when exposed to winds which blow chiefly in one direction; should it be too closely pressed, and become misshapen by other trees or obstructions, it will, very soon after the removal of the obstruction, assume its own regular form, and become equally poised.

The seeds or keys ripen in September, and are easily procured, but should not be allowed to become too ripe, as, in that state, they are liable to be shaken down by the wind. They should be collected when perfectly dry, and laid by in a dry airy loft, and frequently turned over during the winter to prevent mouldiness or decay. They should be sown in March or April, in light mellow ground; and as the foliage, even of the young plants, is pretty large, they ought not to be sown too thick. Having been one season in the seed-bed, they are in a fit state for transplanting into nursery lines, and when nursed there for two seasons, may be planted out for good. When plants of a larger size are required than those which have been transplanted two years, they should, in that case, be taken up at the end of the second year, and replanted in lines, allowing from one-third to one-half more room between the lines and plants. Sycamores succeed when planted of a considerable size and age, but

in extensive plantations, plants from four to five years old from seed will always succeed best.

There are many species of maple, (to which family the Sycamore belongs,) but none of them are likely ever to be cultivated with a view for timber-trees in this country; and indeed the demand for this timber has been on the decline of late years, since the demand of wooden household dishes has been almost supplied by the superior manufacture of earthenware, and the wood of the sycamore is now used chiefly by the cooper, and in some parts of machinery.

Poplar.—(*Populus.*)

Of this genus there are several species that may be considered as timber-trees, and are all of them of exceedingly rapid growth; of them the white poplar, Abele, (*Populus Alba,*) is considered one of the most valuable, and with the black, (*P. Nigra,*) the trembling, (*P. tremula,*) and the Lombardy poplar, (*P. dilatata,*) may be considered the most valuable to the profitable planter. The other species merit more general cultivation than they appear to do at present, as they are all extremely ornamental when in selected situations, and under certain circumstances. The wood of all the species is soft, as is the case generally with rapidly growing trees, and although they are upon the whole short lived trees, compared with their neighbours in the grove, yet the wood of them is by no means liable to decay. The wood being soft, is much used by the sculptor, turner, and toy-maker, and occasionally by the cabinet-maker and musical instrument maker. The bark of *P. nigra* is sufficiently astringent to be used successfully in the process of tanning leather.

The Abele may be said to have been principally brought into notice as a valuable timber-tree, by Lord Sheffield, who used it for floors at Sheffield Place, Sussex; and by Ponty, who not only recommended it in his valuable work on profitable planting, but also introduced it in many of the extensive plantations which he has so successfully superintended in various parts of England. The latter, speaking of the above floors, says that, in appearance they "are superior to any other floor he has seen, whether

of deal or oak; and, as to durability, I see" he says, "no reason to doubt of that, if the density and weight of the article be considered in connection with such testimonies as books afford relative to the point. Floors are, however, only one of the many *inferior* purposes for which it is applicable, as it is certainly proper for almost every article of furniture usually made of mahogany. For the lighter descriptions of it, now so fashionable, it may be made a very good substitute, without any other addition to the natural colour of its heart, than the means cabinet-makers usually resort to, in order to heighten the colour of such wood; and with respect to the sap, and where more of colour is required, the aqua-fortis stain will instantaneously produce it, so far as that it would be difficult to distinguish it from real mahogany. Indeed it is equal to the best in colour and smoothness of surface, and much superior to the plane, or inferior sorts in those respects, as well as transparency and variety; and it has the further advantage over mahogany, and most other woods, that it takes but little of either oil or rubbing, to produce upon it the sort of mellow shining surface so much admired in furniture that has been some years subjected to proper attention." The Dutch, in Evelyn's time, had so high an opinion of this tree, that they looked upon a plantation of them as an ample portion for a daughter, and none of the least effects of their good husbandry.

The black Italian poplar appears to have been introduced into this country since the days of Miller, as no mention is made of it in his dictionary; as a timber-tree it begins now to rank rather high, and is strongly recommended by Ponty, who says it was first sent to Scotland from America, and disseminated through the extensive connexions of the Dicksons and Co. of Hassendean-burn. It is not easily accounted for how it should have obtained the name of black Italian, as it is unknown even in a general cultivated state in that country. This species is an astonishingly quick grower, even, as Ponty observes, "on every sort of soil that may be called tolerable, though it certainly luxuriates most of all in deep fertile ones, while its timber is applicable to purposes sufficiently numerous; among which is that of making good floors; and therefore no doubt need be entertained of its always commanding purchasers. In

that sort of planting, which perhaps may be considered the most profitable of all, namely, that which adds to the comfort and consequence, and, of course, the value of a place, before but scantily furnished with that important appendage—WOOD, this tree is excellent; as, in judicious hands, it may be made to produce very considerable effects, while many others (highly esteemed) would produce them in prospect only. In short, for distant scenery, when wood, not species, is the *immediate object*, this plant, hitherto in many places a stranger, is clearly superior to all the family of the forest."

The poplar family flower in March and April, and perfect their seeds in about three or four weeks afterwards; but as poplars are seldom originated by seeds, but by cuttings, we need only say that when it is intended to propagate by seeds, they should be sown as soon as gathered, in moderately rich soil, somewhat moist and finely pulverized, and great care taken in covering the seeds, as they are very small and liable to be buried too deep. The mode of originating by cuttings is much the speediest method, and is therefore the most practised. The facility by which even large branches of most of this family emit roots is such, that cuttings of several feet in length and some inches in diameter, are not unfrequently made use of; but to obtain the best trees, to be afterwards planted, cuttings of much smaller dimensions should be chosen. There are a few species which are found to propagate better by layers than by cuttings, among which are the black Athenian (*P. Græca*), and some others. The best cuttings of poplars are taken from the wood of the preceding year, and when made, each cutting should be nine inches in length, and planted in nursery lines eighteen inches apart, and the cuttings about six inches distant from each other. When inserted in the ground, they should be put in deep enough to resist the drought, and if only two inches of the top appear above ground, it will be found sufficient. In two years, or three at most, these cuttings will be fully grown to fit them for being finally planted out; but if they are to remain the third year in the nursery, they ought to be taken up and replanted at a greater distance. The white poplar often sends up naturally vast numbers of suckers from its roots, and such are sometimes used for young plants; cuttings are,

however preferable. Langley asserts, that he has known great quantities produced by chips only, where the trees had been hewed after felling; and one old author has proposed ploughing down these chips with a view to produce an economical copse.

Walnut.—(*Juglans regia.*)

The walnut-tree is evidently a native of Persia and China, and the Grecian names for its fruit, says Phillips, of "*Persicon* and *Basilicon*, Persian or royal nut, bespeak it to have been brought from Persia either by the monarchs of Greece themselves, or sent thither from the kings of Persia." The name, walnut, seems to be derived from *Gaul nut*, the seeds or nuts being first imported from France, and the generic name, *Juglans*, from Jovis-glans, a name given them, according to Pliny, by the Romans, and which the Latins translated *Diu-glans*, from whence our Juglans. The walnut is one of the trees which was well known to the ancients, and is much noticed by their poets and historians, and many extraordinary virtues are related to have been due to this tree.

It is stated in the *Hortus Kewensis* to have been introduced in 1562, but there is reason to suppose that its date of introduction must be much earlier; for old Gerard, who wrote about thirty years only after that date, says, "The walnut-tree groweth in fields neere common highwaies, in a fat and fruitfull ground, and in orchards." And Turner, in his Herbal, of 1564, speaks of it as being so common as to need no description. It appears to have been extensively cultivated in this country for the sake of its wood, which was almost universally used for all kinds of valuable furniture previously to the introduction of mahogany, which latter circumstance did not take place till the beginning of the eighteenth century. In some parts of Germany, no young farmer is allowed to marry until he gives satisfactory proofs of having planted a stated number of walnut-trees. The walnut has never been very extensively planted in this country, considering the size to which the tree attains, and the usefulness of the timber, and this is the more singular as this timber has been known to have brought very high

prices, particularly during the late war, for the purpose of making gun-stocks. The tree is hardy, and we do not recollect to have seen, even in the north of Scotland, a disposition in this tree to become stinted in growth, where the soil was at all good and the situation sheltered. It thrives in almost all soils that are not too wet, but it attains the greatest bulk in such as are rich and deep; but the timber on such as are thin and poor, is far more valuable, although less in bulk. In loamy or light clayey soils, it attains a good timber size within a century; and for gun-stocks, for which it is prized above all other woods, it is fit at fifty years' growth or sooner. As an ornamental tree, the walnut has very just pretensions; the general habit of the tree, as well as the beautiful lobed leaves, associate well with garden scenery. It is fit for the decoration of the lawn or the park as a single tree, but when valuable timber is in view, it should be planted in the grove fashion, so that one tree may draw the other up. The best specimens of this tree that we have observed, have, to all appearance, been so drawn up; and when cleared, at a proper age, of the surrounding trees, have become magnificent objects.

Walnuts produce their seeds in most seasons in this country, and by that means are readily increased. The nuts or seeds ripen in October, and should be gathered, and either sown immediately or packed in boxes of sand till the spring. Upon this subject Miller observes: "All the sorts of walnuts which are propagated for timber, should be sown in the place where they are to remain; for the roots of these trees always incline downwards, which being stopped or broken, prevent them aspiring upwards, so that they afterwards divaricate into branches, and become low spreading trees. But such as are propagated for fruit are greatly improved by transplanting, for thereby they are rendered more fruitful, and the fruit is, therefore, larger and better. It being a common observation, that downright roots greatly encourage the luxuriant growth of timber in all sorts of trees, but such trees as have their roots spreading near the surface of the ground are always the most fruitful and best flavored." Evelyn, who wrote previously, says, that those who plant nuts for the sake of the fruit, should

place a tile below the nut, that the roots may be obliged to spread out horizontally.

The nursery practice of rearing walnuts, is to sow the seeds either when gathered or in the February or March following, in beds of moderately rich ground, and the trees are managed similar to those which have originated in the same way. In transplanting walnuts, either in the nursery or at a future period of their growth, great care should be taken that their roots be as little injured as possible, neither should their branches be broken upon any account, both of which is injurious to them. The best time for transplanting them is in autumn, as soon after the foliage drops as possible; and trees of a small size, let it be remembered, will succeed better than such as are large. The walnut seems impatient of pruning, and is, upon the whole, more injured by an application of the knife than an almost total neglect of it. The pruning of nature is the best for this tree, in common with several other forest trees; and if planted in the grove manner, either by themselves or along with other trees, the lashing of each other's branches will be sufficient to effect what the pruning-knife never could have done, without evident injury to the timber.

Willow.—(*Salix.*)

Although some species of willow attain the size of timber-trees, by far the greater portion of them are small shrubs, and only fit for cultivating in osier grounds. Of those that attain a timber size may be noticed, as the best, ***Salix alba***, the Huntingdon willow, and ***Salix Russelliana***, the Bedford willow. The upland willow of Ponty, appears to be only a variety of the former, and is distinguished by its silvery-like leaves and deep red shoots.

The Huntingdon willow attains the size of a lofty tree, and seems common over all Europe, being found both in a natural and cultivated state in Russia, Sweden, and Italy. The Bedford willow is so called in compliment to His Grace the Duke of Bedford, who is an enthusiastic encourager of every thing connected with rural economy and the arts. The Woburn

collection of willows is amongst the richest in the kingdom. This latter tree has a great resemblance to the former, in general habit, and like it, is a very rapid grower, and soon attains a great bulk of timber. The willow tribe, considered as timber-trees, have hitherto been much neglected, and as Ponty very justly observes, "This plant, though well known as a pollard, has been very little cultivated as a timber-tree, and hence furnishes a striking instance of the supineness of mankind in regard to the properties of many sorts of wood. Every one knows the willows are quick growers, and yet it is considered a sort of heresy to suspect that the wood of any of them can be at all durable. There is, besides, an objection to this willow, inasmuch as it usually divides itself into a number of large arms before it acquires any tolerable length of stem: this defect is to be entirely imputed to ignorance or inattention, as few trees require so little management to be made grow with a long clean and straight trunk." In regard to ornament, this willow is not without its share; and, as Sang observes, "Were the Huntingdon willow not so very common, and so frequently met with in low or mean scenery, it might perhaps be reckoned more ornamental than many of the other kinds. They certainly are very elegant plants while young and in middle age; and if not picturesque when grown old, yet there is something very striking in their hoary and reverend appearance."

Willows are naturally found in damp situations, by the sides of rivers, lakes, or brooks, and in such situations are successfully and profitably cultivated; as no other tree, the alder excepted, would grow in such situations. The Huntingdon willow, however, will prosper in situations perfectly dry, and even elevated; and, if planted in the grove manner, will make, next to the larch, probably the quickest return of any other tree. Its bark is used in tanning, and contains about the same proportion of astringency as the birch or mountain-ash. The timber of the willow is used in turnery, machinery, and by the cooper, both for staves and hoops.

To the willow-planter we may add, that the following are and may be profitably planted in situations too wet for other trees to succeed in:—The golden willow (*Salix vitellina*); triandrous willow (*Salix triandria*); the common osier (*Salix*

viminalis); the green osier (*Salix rubra*); the eared willow (*Salix stipularis*); the basket willow (*Salix forbyana*); and the velvet osier (*Salix mollissima*): these are valuable willows, and in most situations will pay better than any other plant. The two-year-old shoots of the second and last sorts are valued by the basket-maker; and those of one year's growth of the others are in equal request. They are all propagated by cuttings which root freely, and plantations of them are often formed in this manner: Willows are generally planted by being pushed into the ground by the hand, which must be well defended by a piece of strong leather; but sometimes in pushing in the cutting, the bark is pressed off. In order to prevent this, it is better to use a common dibble, shod with iron, and have them planted by it like ordinary planting in the nursery. Where the ground is any way hard, or where there is a danger of pushing off the bark, they should be planted so as to leave five or six inches above ground, that when it may become necessary the top of the stools may be cut off, in order to renovate them. This may happen to be in ten or twelve years after planting, and the practice will be found of considerable advantage. It is a matter of indifference whether cuttings be planted in a sloping or perpendicular position.

Having noticed the propagation of the useful forest-trees cultivated in this country, with a view to profit as well as ornament, we will now proceed to notice the various methods of propagating such as are planted for ornament alone, or do not attain a size, under ordinary circumstances, in this country, to warrant their admission into the forest.

Yew.—(*Taxus Baccata.*)

The yew is a native of many parts both of England and Scotland, but particularly the former, and is a tree of great longevity and hardihood. It is most generally found in stature little other than a large shrub, but, as Sang justly observes,—"Whoever has seen that at Tortingale, and those at Kincardine in Perthshire, and at Himley Hall in Staffordshire, will allow an aged yew to be a very picturesque tree." The

former of these trees we have more than once measured, and found it to exceed fifty-seven feet in circumference, an increase of about five feet since 1770; about which time it was measured by the Hon. Judge Barrington, and by him stated to be fifty-two feet round.

As an ornamental tree, the yew has considerable pretensions, and as such we find it generally admitted into the best laid out pleasure-grounds. It makes excellent hedges, and it appears to have been much more generally used for that purpose formerly than now. "No plant," says Sang, "is better adapted for underwood than the yew; it will thrive under the drip of other trees equally with the holly. A grove of yew-trees, in a recluse corner, would be a solemn passage to the grounds of a place. As the cypress in the East, the yew in Britain, has been appropriated to the decoration of sacred ground from time immemorial: it is therefore a fit accompaniment to the temple and the mausoleum." Such appear to have been the ideas of our forefathers, and hence we find these trees in church-yards, and near places of worship, of a vast size, and often in considerable numbers, even in parts of the country where it is almost otherwise unknown. This circumstance has been often noticed, but never satisfactorily accounted for; some asserting that the branches of this tree, used on Palm-Sunday, and other days, for the decoration of churches, gave it a place near at hand; while others, with less probability of truth, suppose the yew to have been planted near churches to afford materials for cross-bows, should the congregation be surprised by an enemy. The sombre appearance of its dark green foliage may be supposed emblematical of eternity, and, like the cypress of the ancients, has given it a place near the resting-place of the dead.

The yew ripens its berries, or seeds, annually with us in October, when they should be gathered and deposited in the rot-heap, mixed with sandy earth, and there left till the September or November following, when they should be sown in beds of rich, well-broken mould, and should be allowed to remain in the seed-bed for two years before they be planted out into nursing-lines. Yews are also often increased by cuttings, and sometimes by layers. Cuttings of the young wood

root freely; and having been once rooted, they should be transplanted out into nursing beds or lines to attain sufficient size, age, and strength, for final planting out. Yews will succeed, although planted of a large size, and such are often planted for particular purposes; but, when extensive plantations are intended, plants from eighteen inches to two feet will always succeed best. It is but seldom, if ever, that this tree is planted to any considerable extent with a view to attain a timber size; but, although a slow growing tree, circumstances may warrant, in favorable situations, extensive plantations to be made, as the timber is valuable when of a large size, and of great durability.

Oriental Plane.—(*Platanus Orientalus.*)

This is a very interesting and highly ornamental tree, and, although not suited for extensive cultivation in this country, it is nevertheless a tree which should be found on every lawn, where any thing like decorative planting is attempted. It is sufficiently hardy to withstand our severest winters, and has stood those that have killed trees considered of a much hardier nature. The Oriental plane is a native of the Levant, from whence it was introduced here in 1548. The Romans introduced it from the same place to Italy, and spared neither cost nor pains in its cultivation. Cicero and Hortensius are said to have been so partial to this tree, that they spent much time in attending to its cultivation; and to such an extreme did they carry their regard for it, that they are said often to have poured wine to its root instead of water. This tree, in favorable situations, ripens its seed in England, and is, by that means, increased by those who take the trouble of rearing trees from seeds. It is, however, by far the most frequent, but less rational practice, to increase it by layers, which root freely, and make larger plants in less time than seedlings, but the former never make such fine trees as the latter. The seeds should be looked for in fine seasons in October, and gathered when ripe. They should be sown as soon after they are gathered as possible; and if put into a fine pulverized rich soil, will make their appearance in due time, in March or April

following. When the process of laying is to be adopted, it should be done in October, and will, by the autumn following, be well rooted, when they should be taken off the stools, and planted out in nursery-lines to get strength. As the foliage of this tree is large, it is therefore necessary to allow it plenty of room in the nursery; say, from twenty inches to two feet between the lines, and from a foot to eighteen inches from plant to plant, in the line. Ælian, and other authors, have given strange accounts of this tree; such as the effect it had on Xerxes, at the head of his army, and his having medals of gold stamped with its figure, which he carried constantly about his person. The Licinian *Platanus* has been recorded to have exceeded eighty feet in circumference, and capable of accommodating within its trunk the Consul Licinius Mutianus and his retinue. It has not ever attained any extraordinary bulk in this country, and, considering its early introduction, may rather be considered a rare tree, particularly as it has not fallen a sacrifice to the severity from climate like the following.

American Plane.—(*Platanus Occidentalis.*)

A much tenderer species than the last, and introduced here from America, as the name implies, in 1640, about one hundred years after the Eastern Plane. This, like the last, attains an enormous size in their native countries, but with us can only be reckoned upon as a tree of the third or fourth class of magnitude, and limited to the lawn or more sheltered parts of the park. The almost general destruction of this species by frost, about the middle of the last century, and the partial loss of many others in 1809, have alarmed planters from propagating this tree so extensively as could have been wished. Many trees of this species, of a considerable size, existed previously to the first of these disasters in many parts of England, as at Sion-House, Pain's-Hill, Kew, Stow, and some other places, but which fell a sacrifice to the inclemency of our climate. And, in 1809, almost all the trees of a large size of this species were killed, while those from twenty to twenty-five feet were not materially injured, and those of a smaller size were not injured at all. The winter's

frost does not seem to injure them so much as the late frosts in spring, and the occasional ones of summer, as was the case in 1809, when the frost of June, which was unusually severe, just as the trees were coming into foliage. The leaves were killed, and the trees pushed, late in the season, into a second foliage and shoots, which were killed by an early autumn frost. The trees made an effort to push in the spring following, but failing, finally languished and died. The seeds of this species ripen more freely in this country than the last species, and should be collected in October when they are ripe, and sown immediately, by this means plants are to be obtained in plenty; but nurserymen seldom originate them by this means, and have recourse to the process of laying, and sometimes by cuttings. Cuttings, if put in, in autumn, succeed pretty well, and may be by the autumn following expected to be sufficiently rooted for planting out into nursery-lines; and layers, laid down in autumn, will also by the autumn following be sufficiently rooted to be fit to plant out in lines also. When cuttings are to be made use of for propagating this tree, those shoots of the last season's growth which are well ripened should only be made choice of, and should be from nine to twelve inches in length. These, if planted in moderately rich ground, will root freely, and make fine plants.

ORNAMENTAL PINES.

Under this head may be included a number of extremely curious and interesting species of the *Pinus* genus, which, either from their delicate habits, diminutive growth, or other circumstances, render them unfit for planting in the general plantations, and are generally admired and most in character when planted singly on the lawn, or in systematic order in the arboratum, &c. So numerous and interesting is this genus, that they may be said to form of themselves a very complete and interesting collection, and as such have been exemplified at Dropmore, the seat of Lord Grenville, where there is the finest collection in cultivation in Europe, and contains fifty-two species, including the three species *Araucaria*, *Cunninghamia*, and *Dammara*, to which they are nearly allied, and which are

of extremely interesting habits, and if naturalized into our pleasure-grounds, would materially alter their characters in a pictorial point of view. The majority of these are to be propagated from seeds imported from their native countries, when they do not ripen with us; and when such cannot be obtained, recourse must be had to the usual modes of propagation, namely, by layers and cuttings, and probably some species might be increased by grafting or inarching. Seeds are the natural mode of propagation, and always succeed best, and make by far the finest trees. But seeds of many of the rarer species are difficult to be procured, and some lose their vegetative property before they can reach this country.

Several species of this genus will strike roots by cuttings, but they seldom form a leading shoot to give them the character of a future tree. Such is the case with *Pinus lanciolata*, now *Cunninghamia lanciolata*, which may be said to root by cuttings freely, not one in ten of such plants, if left to themselves, will ever form a proper leader. It has been suggested, and indeed almost proved, that plants so originated when cut down to the collar, or to that part which may be said to divide the root from the stem will shoot out proper shoots from which a leader may be selected, and which will form a future tree. The celebrated *Araucaria excelsa*, when propagated from a cutting, the only method of increasing it in this country, continues little other than a branch, but is said to be completely altered in its character by a similar process. It has also been suggested, that if those plants which have been increased in this manner be laid down at their whole length, and their principal stem bent so as that several parts of it will protrude through the surface, that upright shoots will be sent up from such parts that will form proper leaders; when such is the case, and when the parts under ground have emitted sufficient roots, they should be separated by cutting the original leading branch into pieces, each of which will form a future tree. So desirable a tree as this, and one that, if once acclimated to our sheltered lawns, would be so very ornamental, deserves all our care in order to propagate it, and likewise to protect it should it once be increased. One of this genus, *A. imbricata*,

has for several years stood out in the Royal Gardens at Kew, and has only to be seen to be admired.

Cunninghamia lanciolata, of which the annexed wood-cut engraving is a very faithful representation, and drawn on the spot expressly for this work, has stood out in the pleasure-grounds at Claremont for twelve years, and one of them has attained the height of sixteen feet, and nearly as much in diameter through the branches, and is supposed the finest specimen in the kingdom.

Pinus longifolia, a native of the East-Indies, has stood out at Dropmore seven or eight years; *P. sinensis*, a na-

tive of China; *P. canariensis* is from the Canary Islands; *P. excelsa*, from Nepal, in the same collection, are thriving trees.

There are many others, although sufficiently hardy to stand unprotected in our climate, that are almost unknown to the generality of our pleasure-grounds, of these may be noticed the Hemlock Spruce, *P. canadensis*, from North-America, where it attains a very great size, both in altitude and diameter, but with us only that of a large shrub or very dwarf tree. It is exceedingly ornamental, but to be such requires to be planted in rather a moist and shaded situation. In dry exposed places, it seldom looks healthy, and is apt to divide into too many irregular branches, and seldom to attain a leader amongst them. It is propagated by seeds, which are imported annually from America, and should be sown in March or April, in finely prepared, rich, light mould, in shallow boxes or pans, and placed in a frame or shaded situation. During summer, they should be regularly supplied with water, and the spring following the sowing they may be transplanted out into lines, at the distance of one foot apart, and six inches apart in the line. If it be wished to obtain large plants of this species, they will require to be once or twice taken up during their stay in the nursery, and again transplanted, allowing more room between the plants each time.

The *Pinus cembra*, Siberian stone-pine, is also a rare plant, comparatively speaking, in our pleasure-grounds, and exceedingly ornamental in all its stages of growth, particularly when it attains a considerable size. It is of slow growth in all situations, but sufficiently hardy, as its name implies. It is propagated from seeds, which are occasionally imported, and there is reason to hope that a sufficient supply may be yet obtained from trees in our own country. Such trees as those at White Knights, Claremont, and Powis Castle, are very likely to produce seeds, as they have attained both size and age sufficient to lead us to expect such a result.

A Calculation of the number of Plants requisite to plant an English acre of ground, according to their sorts and sizes; the plants at the under-mentioned distance. Also, the number of rods, yards, and feet, when let to labourers to trench, or to prepare for planting.

Feet apart.	No. of Plants.	Feet apart.	No. of Plants.
1	43,560	10	435
1½	19,360	11	360
2	10,890	12	302
2½	6,969	13	257
3	4,840	14	222
3½	3,556	15	193
4	2,722	16	170
4½	2,232	17	150
5	1,742	18	134
6	1,210	19	120
7	889	20	108
8	680	25	69
9	537	30	48

An English acre contains 160 rods or poles, 4,840 yards, 43,560 feet.

In planting upon an extensive scale, the ground is generally prepared by task-work: draining by the rod; trenching by the acre, rod, or pole; and planting sometimes by the hundred or thousand, and also by the rod or acre. The preparation of the ground may almost always be with economy done in this manner; but in regard to planting, at least putting in the trees, it may be expected to be better done by day-work. The pits or holes, however, when the trees are so large as to require that mode of planting, may be done by the hundred, thousand, or by the acre, pole, &c.

In purchasing hardy trees or shrubs, the former, particularly forest-trees, are bought by the thousand, when small; by the hundred, when larger; and, when very large, by so much per tree. Shrubs of the most common kinds are purchased by the thousand or hundred; and when new, rare, or expensive, by the individual.

THE END.

INDEX

TO THE SUPPLEMENT.

Printed by J. Rider, Little Britain, London.

DIRECTIONS TO THE BINDER.

☞ *As this Work would be rather too bulky in one Volume, as at first intended, we recommend it to be bound in two; we have accordingly furnished a Title-page for the Second Volume, and think the division should be made at page* 554, *commencing Vol. II. with Forcing Garden for January. The Binder is requested to place the* "Rise and Progress of Gardening," *published in the last part, and commencing with page* ix, *immediately after the Preface, page* viii.

On the 1*st November*, 1829, *will be published*,

INTENDED AS A SUITABLE COMPANION TO

MR. Mc. INTOSH'S PRACTICAL GARDENER,

THE FIRST NUMBER OF A NEW AND ELEGANT WORK, ENTITLED

FLORA AND POMONA;

OR,

THE BRITISH FRUIT AND FLOWER GARDEN:

CONTAINING

DESCRIPTIONS OF THE MOST VALUABLE AND INTERESTING

FLOWERS AND FRUITS,

CULTIVATED IN THE GARDENS OF GREAT BRITAIN,

WITH FIGURES DRAWN AND COLOURED FROM NATURE.

IF we refer to the many useful Botanical and Horticultural Publications for which the literature of this country is so eminently distinguished, it may, by some, be deemed superfluous to attempt to add another to the already voluminous list; but one of the principal objects of the present Work is to lay before the votary of Flora and Pomona, in plain and intelligible language, that information, from which he has hitherto been excluded by his ignorance of the phraseology which it has been found necessary to adopt, to render the scientific descriptions of plants intelligible to readers of all nations, and which will impress on it a value which no other Botanical Work extant is known to possess.

The ornamental part of this Work will consist of the exhibition of rare and valuable Fruits and Flowers cultivated in the most celebrated gardens of Great Britain, accurately and beautifully coloured from the subjects themselves, in the stage of their highest perfection, accompanied by a plain description of their origin, botanical and pomonological characters, the period of their introduction into this country, with general observations on their nature and mode of culture.

The chief design of this Work is to bring together into one collection, such Flowers only of the first order, as are deserving of a place in the GREEN-HOUSE, CONSERVATORY, STOVE, and FLOWER GARDEN; and the same plan will be pursued with the HOT-HOUSE, the FRUIT GARDEN, and the ORCHARD.

This Work will be published in Monthly Parts, each containing Three highly-finished and accurate Engravings, in equal proportion of Flowers and Fruits, and no Drawing will appear in the Work which is not taken from the *object itself*, and to which reference cannot be given of the place of its growth. The Ornamental department will be executed by Mr. E. D. SMITH, F.L.S.; the Literary department by Mr. C. M'INTOSH, author of that popular and much-admired Work, "THE PRACTICAL GARDENER and MODERN HORTICULTURIST."

A part of this work will be devoted to *Instructions for drawing and colouring Fruits and Flowers, with the requisite directions for properly mixing the colours*, and other minutiæ attending the acquisition of so pleasing an accomplishment, by Mr. SMITH, who has undertaken to attach to each part of the Work the necessary instructions for the colouring of the respective Fruits and Flowers which are given in it. It will be necessary to observe, that the Work will be so printed as to allow of the Botanical, Pomonological, and Drawing departments, being bound up separately from each other, for which purpose Title-pages and Indexes will be furnished accordingly.

For the purpose of carrying this desirable plan into execution, it is intended to publish four editions of the Work. The first in Parts, price 1*s.* 6*d.*, with the Plates in outline, plain, in Octavo size; the second, price 2*s.* 6*d.*, with the Plates beautifully coloured from nature, in Octavo size, to correspond with, *and forming a suitable companion to*, "THE PRACTICAL GARDENER," just completed; and in order to meet the views of those who are desirous of becoming proficients in the Arts of Drawing and Colouring, a Quarto Edition will also be published, with the Plates coloured and plain; the former at 3*s.*, the latter at 2*s.* each Part.

It is purposed to commence the Publication of this Work on the 1st of November next, immediately succeeding the conclusion of Mr. M'INTOSH'S PRACTICAL GARDENER; and to the Subscribers to that intrinsically useful Publication the Proprietor respectfully begs leave to recommend this Work as a necessary and elegant Appendage.

LONDON: PRINTED FOR THOMAS KELLY, 17, PATERNOSTER ROW.